THE AMERICAN GAS LIGHT JOURNAL

PUBLISHING OFFICE No. 42 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE.

VOLUME LXXXVII., No. 18. Whole No. 1,690. | NEW YORK, MONDAY, OCTOBER 28, 1907. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. | THOMAS J. CUNNINGHAM, ELBERT P. CALLENDER, Editors.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND CLASS MATTER.

Published on each Monday of the year, at No. 42 Pine Street, New York.

Telephone.—2996 John.

Terms of Subscription, Including Postage.—For the United States, $3; Canada, $4 per annum. European countries, $5 (£1—25 francs).

Remittances should be made either by post office order, express money order, registered letter, or bank draft on New York, payable to the order of A.M. Callender & Co.

The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

CONTENTS.

An Asterisk (*) denotes an Illustrated article.

EDITORIALS—
The Ending of the Institute Meeting 749
Current Comment 750
Third Annual Meeting, Empire State Gas and Electric Association—Furnished by the Secretary—Continued from page 710. 750
First Day—Morning Session—Discussion on Reports of Special Committees—Report of Committee on Insurance—Discussion.
Depreciation, by Dr. Alexander C. Humphreys—Concluded from page 715. 753
Fifteenth Annual Convention, Pacific Coast Gas Association—Continued from page 717. 758
Second Day, Morning Session—*Wrinkles.
High Pressure Distribution: Its Effect on the Illuminating and Calorific Powers of Gas. 760
Thoria in Ceylon 761
SPECIAL ENGLISH CORRESPONDENCE 761
More about Coalite—The Site for the New Gasholder—Municipal Trading.
ITEMS OF INTEREST FROM VARIOUS LOCALITIES 762
Rate Concessions, San Diego, Cal.—The Money is Not Up—Betterments, Easthampton, Mass.—Minutes to the Memory of Mr. F. T. Moran—Why?—Personal—Proposed Works for Parkesburg, Pa.—Clerk Williams is the Stakeholder—The Osborne Lecture—Some Ordinances for Cincinnati, O.—Prof. T. S. C. Lowe Deposed—The Mueller Souvenir Book—Personal—Something from Scranton, Pa.—Public Lighting, Queens Borough, L. I.—The Bessemer (Ala.) Plant—Annual Meeting, Troy, N. Y.—Death of Mr. Edward Gauss—Death of Mr. W. Goddard—And Other Items.
The Market for Gas Securities 764

THE ENDING OF THE INSTITUTE MEETING.

The closing day of the meeting (Friday, October 18) was marked by good weather and an excellent attendance, at least 200 members being in the convention hall when President Clark announced the regular order. The first matter to engage the delegates was the naming of two of the most important standing committees, the personnel of these being:

Public Relations.—Messrs. E. G. Cowdery (Chairman), I. C. Copley, Chas. F. Prichard, John J. Gribbel, D. McDonald and W. Clark.

Technical.—W. H. Gartley (Chairman), A. S. Miller, W. A. Baehr, Wm. E. McKay, R. B. Brown and A. G. Glasgow.

Mr. W. H. Gartley next handed in the report from the Committee on Information, and although only eight questions had been submitted during the course of the year, these were of such a nature that it was suggested and ordered that the same be published in the "Proceedings." Mr. J. D. Shattuck, from the Board of Revision of the Question Box, reported that while the work was not completed, it was certain to be ready in time for incorporation in the "Proceedings," and it was ordered that it be so printed. Two communications respecting the matter of "Air Blast Gas Appliances" were considered, respectively by Mr. W. K. Eavenson, of Philadelphia, and Mr. W. H. Allen, of Newark, N. J., the latter covering the subject from the point of view of the commercial man. The discussion was a good one, and its general trend was to bring out the fallacy of attempting to raise flame temperatures by preheating.

The paper by Mr. W. A. Baehr, of St. Louis, giving "Instruction for Operating Recuperative Benches," owing to the absence of the author, was not read, but it was passed up with the understanding that it was to be printed in the "Proceedings," together with any discussion thereon that might be submitted in writing during the interval. Mr. Walton Forstall now read the report of the Committee on "Uniformity of Meters," and the subject was disposed of by the discharge of the Committee and the referring of the matter to the Technical Committee. The Nominating Committee was invited to hand in its report as to the naming of a Secretary-Treasurer. A majority of the Nominating Committee, perhaps tired out by their labors of the morning, failed to respond, in ratification of the recommendation of the Board of Directors that Mr. James W. Dunbar be nominated for the joint office. That faithful and successful servitor of the grand old Western Gas Association and later of the Institute was thereupon nominated by petition and elected unanimously amid the cheers of the delegates. We regret that Mr. Dunbar's election was more in the nature of an honorary than an active one, for while he will sign as Secretary-Treasurer, the Board of Directors resolved that an assistant be employed to do the actual work, at a salary not to exceed $3,000 per annum, he to have charge also of the permanent headquarters in New York city—it must be said here that Mr. Dunbar refused positively to longer actively serve. The Institute having made proper acknowledgment of Treasurer Jones' services during the year, the report of the Committee having in charge the compiling of results on "A" meters, as gained during the year in Philadelphia and two other cities, was disposed of—the tables were quite interesting. Communications on "Experiences with Dipping Meters" were submitted by Mr. W. A. Castor and on account of Mr. George Beadenkopf. Very gratifying results were reported for the method of dipping diaphragms as outlined, and the discussion was notable for the part taken therein by that dean of the meter business—glorious, ever young Jno. McIlhenny. A new carbonic acid gas indicator was then described by Mr. C. D. Robison, of Nyack, N. Y., and his effort was rewarded by a good discussion in which the fault of such apparatus and the difficulty of applying it to water gas machines were dwelt upon. The matter of pipe standards was again trotted out, the lines therein coming from the special committee that has been handling the subject for years. The subject was handed over to the Technical Committee, with the perfectly sensible advice that the pipe manufacturers be conferred with before any further recommendations in the premises were made to the Institute. A motion to discharge all committees that had not reported at the meeting, their work to be

LIBRARY OF CONGRESS
OCT 28 1907
SMITHSONIAN DEPOSIT.

turned over to the Technical Committee, was adopted. The Committee of Arrangements were awarded a hearty vote of thanks for their successful efforts. A few closing remarks were uttered by the President, and the second annual meeting of the Institute was declared at an end.—C. C.

CURRENT COMMENT.—

WITH greal regret we have learned that Mr. William Cox, whose studies have resulted in the preparation by him of mechanical computers for the shortening of many intricate and wearisome calculations, is in great distress in a financial way. His gas flow computers have made his fame and work well known to the gas industry; furthermore, in aiding him we say to the fraternity that their aid is well and worthily bestowed. The *American Machinist*, to the columns of which excellent periodical he was a frequent contributor, has opened up a subscription for his benefit, and those who forward their gratuity to the office of the paper named (505 Gold street, New York) may rest assured that it will reach Mr. Cox in the shortest possible time.

MR. A. F. HALL, writing from Atlanta, Ga., under date of the 20th inst., forwards the following: "The State Railroad Commission last week finally disposed of the prepayment gas meter case, which has been pending for some weeks, and which took up three separate hearings. The Commission decides that the rules of the Atlanta Gas Light Company, in respect of its practices towards customers, are reasonable, and that its customers are rightly bound by them and so must accept them. T. L. Ingraham was the complainant, and his complaint was based on the refusal of the Company to instal a prepayment meter in his home, 276 East Fair street. He asked that the Commission be ordered to require the Company to put in a prepayment meter in his home, although he admitted he owed it a bill of $24 for gas which he had not paid and which he had put in voluntary bankruptcy. The Company agreed to put in a slot meter for him if he would give notes for the back debt, and he did so. Ths meter was then installed, but when he failed to pay the first note it was again taken out. Ingraham brought suit against the Company for $5,000 damages and also carried his case to the Railroad Commission, who decided against him on all points."

THE special shareholders' meeting called for the purpose of deciding whether or not the capital stock of the Calumet (Mich.) Gas Company should be increased to $150,000 from $100,000, was unavoidably postponed, strange to say from the lack of a sufficient representation of shares—the day was set for the 18th inst. The Directors propose to use the additional capital to provide for betterments and likewise make it possible to undertake work which the present limited capital makes impossible. The new issue will be offered to present shareholders for subscription, and if not taken up by them will undoubtedly be readily sold to those who are waiting for an opportunity of picking up some of the gas stock. It is not at all improbable that the Company may be given an opportunity of illuminating the streets of Laurium by gas.—B. D."

THE growth of the Berkley (Cal.) Electric Lighting and Gas Company has been so rapid that it has been obliged to remove its offices, from their original location in the Shattuck Building, to more commodious rooms in the new Such Building, corner of Allston Way and Oxford street.

A COMPLETE trial of gas tar surfacing for controlling "dusty roads," both as to extent of length and time, is to be made under the direction of Mr. George C. Call as the city's special Commissioner, by the authorities of Sioux City, Ia. The Correctionville road has been selected as the trial avenue, and $1,000 has been appropriated to carry on the test.

MR. G. A. LANE forwards the following from Green Bay, Wis., under date of the 22d inst.: "After a discussion, having many phases and covering many months yes, years - the authorities of Green Bay, Wis., and the Green Bay Gas and Electric Company, have settled the matter of municipal lighting. The city has agreed to give the Company a 5-year contract, in which it is stipulated that the Company shall furnish and maintain 200 arc lamps, of 2,000-candle each, partial moon table basis, at the rate of $70 per lamp per annum. One clause in the contract directs, in case of a contention during the continuance of the contract, that the city or Company may apply to the State Railway Commission to adjust the price. If $70 is too high, the Company will rebate the difference between that price and the price named by the Commission. If the price is too low the city will pay the additional amount.

[FURNISHED BY THE SECRETARY.—CONTINUED FROM PAGE 710.]

PROCEEDINGS OF THE THIRD ANNUAL MEETING OF THE EMPIRE STATE GAS AND ELECTRIC ASSOCIATION, HELD IN NEW YORK CITY, WEDNESDAY, OCTOBER 2, 1907.

MORNING SESSION.

Discussion on Reports of Special Committees.

The President—Mr. Beal, can you give us any information on the matter of the application from the Newburgh Company?

Mr. Beal I would like to say to Mr. Freeman that I had not the information at the time the letters came around, and only recently learned something about it, so as to give the reason. We asked for an 8 per cent. cumulative, preferred stock issue, because we wanted to strengthen the character of the issue and make it more attractive to those to whom we expected to sell; namely, to our own stockholders. When we made our application only three Commissioners were present to hear what we had to say, and we got the impression that they were going to give it, and we were surprised after a long delay to get the opinion rendered by Mr. Decker. We stated that, after consideration and investigation of the plant, it would warrant the $250,000, and that the only objection they had was that it was cumulative preferred stock. He contended that cumulative preferred stock, if not in our own case, conceivably in some other cases, would settle on the community a definite future obligation which would require the raising of that dividend through the price of gas and electricity, which might be a hardship to the community. He said there was nothing personal to our case. I have since then received an intimation that if the cumulative feature had been left out of the application it would have gone through. I think we shall renew our application in the same form, and take our chance on it. I think things which have happened since the application was made in June indicate to the Commission that any public service corporation must have its stock as strong as possible to get cash for it.

Mr. Freeman—The validity of all the acts, both of the old and the present Commission, is to be an issue in the case fixing the rates in Saratoga. Senator Brackett, who represents the Company, has raised the contention that the Legislature has not the right to delegate such powers as are sought to be given to these Commissions. If he should succeed in that contention it does away with the old Commission, with the present law and the present Commissions. I do not know that the members of this Association desire him to succeed in that contention; but it is an interesting case, and doubly interesting from the further fact that that issue is to be met squarely in that case.

The President—As I understand it, this is a standing committee, which will hold office right along. It is certainly one of the most important committees which we have, and it is extremely important that every member of this Association should keep the Secretary informed of any dealings which he may have with the Commission, so we may have the benefit of anything which may be done.

Mr. Searle—If it should please all the members present, I would suggest that, when they talk to the people and to the officers and members of the Commission, that they cut away from the idea that we are entitled only to a 4, 5 or 6 per cent. return. It seems that 6 per cent. is considered by many in the country all that we should receive. That is all right where the money is loaned on real estate, where there is no risk; but the business should be taken as being on a reasonable basis of profit, certainly not less than 10 per cent. I know a number of financiers who are not going to put their money into anything unless they see a return of 10 or 12 per cent. The first question a man asks when you want him to get in is, "What do I get out of it?" no matter whether it is a member of the Commission or a director in a company or a president of a company. As one member of the Commission said, the companies will suffer if they take the basis that a return of 4, 5 or 6 per cent. is sufficient. They should take the stand that at least 10 per cent. is proper. I do not see how they can talk less than 10 per cent. profit.

The President—I think Mr. Searle's point is very well taken. If we met and talked over the policy to be pursued we can certainly get great advantage from it. That fact was brought out strongly at the meeting held in the Hotel Ten Eyck, and various ideas were brought forward there. So we must all get together and decide upon the policy we are to pursue; especially is this the case with this matter of interest or return upon investment. We must follow out the policy that 8 or 10 per cent. would not be too much for us to receive.

Mr. W. W. Cole—I do not think 10 per cent. is sufficient, for the reason that, in addition to the interest on the actual investment you

have a deterioration or depreciation account of at least 5 per cent. In addition, an account not generally recognized among companies or financial men is the contingent expenses. That is, you run along for 2 or 3 years, then in the fourth year something abnormal happens, either a strike or an accident or a fire or something of that kind, something unusual, which wipes out your 5 or 6 per cent. return for a period of years. In addition to the contingent expense account, another account is not generally recognized, and especially so among the electric companies. Take your arc light, ordinarily in 5 years the arc light is a back number, so your depreciation charge there is practically 20 per cent.; but all the companies are expected to keep up with the times, and they are hounded continually, so the expense for exploiting new material is a most important item. It would surprise most companies to learn what that expense amounts to. I do not believe, if a company has to keep up with the expense of continually installing new materials, that 10 per cent. is sufficient to compensate fully in the conduct of its business.

Mr. Beal - Does not that bring us back to the subject Dr. Humphreys spoke of last night, that of uniform accounting and the necessity of getting the information before the Commission. In the paper of Dr. Humphreys read at the meeting of the New England Association of Gas Engineers, he stated that 5 cents per 1,000 should be allowed in the gas business as a contingent fund, and he said the company should be allowed to accumulate a fund up to 10 per cent. of its capital. That is done on the other side, and it seems to me we should adopt it here. That is to say, that the Commission allows us to set aside a contingent fund in a sum not in excess of 10 per cent. of the capital, based on the unit of a 1,000 feet of gas and a kilowatt of electricity made or sold. That fund would be an increasing fund, and in course of time would take care of the contingency suggested by Mr. Cole, until it reached a given percentage of the capital, when it might conceivably be stopped, remaining an interest drawing fund. If we were allowed to earn and put aside that interest, the question of dividends and of interest on investments would be subjects entirely apart from that. In other words, we should try to urge on the Commission that we should allow the people to earn a proper return on the money put up in our enterprise.

Mr. Cole - I would like to suggest to the Committee on Standardization of Accounts that an account be considered that has never yet entered into any classification, to be known as "unproductive account," and to this you would charge expenses of a certain nature which bring in no return. There are many such expenses, and to large companies they amount to thousands of dollars in unproductive investments, and I believe an account of that kind would bring out more graphically many conditions of expense which are not taken account of to-day. Some such classification should receive our earnest consideration.

Mr. Freeman – I should like to emphasize what has been said by Mr. Beal and Mr. Cole. Much of the fault in this matter lies with ourselves. It has been the custom of a great many companies to take the first profits that come in over and above fair, actual, operating costs and expenses, and to pay them out in return to the stockholders; and then, when they find that they are facing an investigation as to rates, or something of that kind, they then raise the question of depreciation, and charge it off in a lump, and those with whom they are dealing at once conclude that that is but an attempt to collar more money than they pay out in dividends. That is a natural conclusion, and we have ourselves largely to blame for it. I firmly believe we can insist upon and secure a proper allowance for depreciation, but we must reverse the order of things in order to succeed. We must recognize ourselves that these elements are as most items of cost, as coal, labor and other items, which now appear in our accounts. We must charge those items into our costs, and pay dividends only out of the funds over and beyond those amounts; then, when we come to make our contention, we are contending on the perfectly sincere basis which cannot be discounted. With that in view, on the first of January of this year our Company began every month to charge up a sum equal to ½ cent on each kilowatt sold. We charged it as an element of replacement and depreciation, and it is as much an item of expense as the coal bill and wage account. We are replacing a feed water plant, and all the items of it are charged against that account. When we come before the Commission, as we do, with that item amounting to $350,000 or $400,000 in a year, it will be recognized as an expense, and not considered in any sense an element of profit, and a deduction from the amount we are entitled to have and be paid; but if we are to succeed in this matter, each company must settle (if we can agree among ourselves) for itself what that amount should be, and constantly put it in the expense account, keeping it out of its profits and earnings, otherwise we will be accused of trying to get profits which we are not entitled to. We must count these up and determine what they are, treating them as they should be treated; but as long as we leave it something indefinite, between 5 and 10 per cent., we do not know what, I cannot see how we can expect the Public Service Commissioners to settle that which we cannot settle for ourselves. We should adopt a definite, plan, then enter the amount we agree upon on our books what we think is right, and then eliminate that item from any question of profits we are entitled to earn and pay to our stockholders.

Mr. Cole - What did you call that account?

Mr. Freeman – "Replacement and Depreciation."

A Member—Any such expense should be kept out of the profit and loss account. I believe it is a practice of a good many companies in the State to call everything of operating expenses profit and loss. Then, when the end of the year comes around, they take out what they call "depreciation" by a vote of the Board of Directors; and sometimes it is a very large amount. It seems to me it would make a better showing on the books, and it would help the Commission, if these items were kept out of the profit and loss account entirely, and treated as Mr. Freeman suggests. In the case of the companies I represent for the last 2 years we have done that. We do not call the account that particular definite name, but it amounts to the same thing. In the gas department we charge off a definite sum, which is called a Reserve Expense, and it is then put into reserve fund.

Mr. Sheehan – In dealing with this subject we are dealing with a public having certain definite knowledge of what they consider should be a fair return on an investment. A large portion of the people know that the savings banks pay 4 per cent.; and, until later, 5 per cent. was considered a sufficient return on money; and for some time to come it will be considered that 6 or 7 per cent. should be the return on an investment where there is a feature of risk. The public does not know what a lighting company doing business 150 miles inland has to pay per ton for its coal. The companies along the line of the Hudson pay $3.25 per ton, and further east, in New England, from $4 to $4.25 to $4.50 per ton. Our Public Service Commission, if Mr. Brackett should upset the law, will be followed by another Commission, because government by commission has obtained such headway that we will have to meet it. Government by commission is now pretty well favored throughout the United States, so you may be sure we will have another Commission if we do not have this one. The task before us is to deal with our Commission, that the notions which the public have as to what a proper return upon an investment in our business is, will be supplanted by a correct one, so that they will believe that 10 or 12 per cent. is not too great a return; and in order to have them do that they must be taught all the facts of that business. Our work is to deal with the Commission. I do not want to discredit the value of the publicity work of this Association, but I think we make a mistake if too great attention is given to publicity work. I believe a portion of money that perhaps we are now expending for publicity work could be well expended in some other direction that will have more direct bearing on the Commission than any kind of publicity work will have. I do not decry giving a proper value to publicity work, but do not let it withdraw our attention from other things which we can accomplish as an Association. Tracing the effect as far as I, or any individual can, these notices might be classed as miscellaneous articles not read by the average newspaper reader, chiefly because of lack of time. Aside from what we may do in the way of publicity work, let us consider what else may be done. This Public Service Commission is supposed to be in a much more receptive mood than the other one was. Let us impress this Commission before the members take their cue from some other source and lay out a course or policy to be followed. The meetings referred to by our President, with respect to the actions we took, by meeting in different towns and dealing with the Commission, are instances which we should emphasize, and this is the accepted hour to do it. We should, by the efforts which seem best to the Association, work directly on that Commission before they become hidebound in some theory – for instance, a theory which caused them to object to the request made by one of the companies for an issue of $250,000, by reason of the belief that there would be a precedent established which would rise up and meet them in its issue. They should treat each question on its merits and not be afraid of establishing a precedent. The Commission is not a court of law whose precedents could not be recalled later and overruled if necessary. I think we should emphasize our action on that line.

Mr. Searle – This discussion leads to the suggestion that there is a

Committee handling, up to a certain point, the points covered, and that is the Committee on Uniform Accounting. I do not suppose that, in the history of the world, three men could be gotten together who understand this subject so well as Messrs. Carter, Curran and Cooke. They have had an experience throughout the United States and I do not think there is an accountant to-day who can handle more work more intelligently than Mr. Carter. He has all he can do now. But I would like to bring out what we have done on the gas and electric committee at Albany. On the question of profit when I said 10 per cent. a while ago, I meant profit. I could take a profit and pay 20 per cent. a year, and in 3 years let the plant go to the devil. I mean, we are entitled to 10 per cent. over and above proper expenses of running the plant. There may be local conditions which entitle certain companies to receive special rates; we should make it 10 per cent. a year to gas companies, and electric companies should make 20.

The President—This discussion simply confirms our ideas as to the importance of this Association and of our getting together on these various points. The question of depreciation has been taken up suddenly. If there has been too great a tendency to treat their stockholders well and put by the evil day when they must make a charge for depreciation, that must be stopped, and the thing should be charged off as a regular monthly item of expense. If at the end of the year they could cross off 10, 20, 30 or $40,000 for depreciation, they have done it. It would be much better if we could decide on a uniform basis of cutting off that much each week, or in each period in which we charge up our operating expenses. It must come, and I do not think there is any question in the mind of those present that it must be done. We cannot continue as we have in the past, taking our chance on deducting what we feel like and christening that amount as a charge for depreciation. It is a definite, fixed charge which we must take care of. Are there any other remarks to be made in relation to this previous discussion?

Mr. Cole—Has the Committee on Accounting ever conferred with the accountant advisers of the Public Service Commission?

The President—Next is the report of the Accounting Committee. Is anyone present to report on its behalf?

The Secretary—Mr. Carter asked me to report progress on behalf of the Accounting Committee. It is doing a great deal of work, but has nothing definite to report. At present the Committee is trying to meet Mr. Myers, the statistician of the Public Service Commission of the Second District, and that from meeting with him it is expected to accomplish a good deal. So, on behalf of the Accounting Committee, we can report progress.

The Secretary—Mr. Myers, of the Interstate Commerce Commission, has been appointed statistician of the Second District Public Service Commission. He was to have taken office on the 15th of September, but was a little delayed. The last I heard he was to be there on the 27th of September. The committee has made every effort to meet Mr. Myers, and I think they will do so as soon as he gets to Albany. He has been communicated with at Washington.

Mr. Bradley—As things stand it seems they are in a fair way to get a uniform system of accounting that will be just to the company and to the public and in accordance with the wishes of the Commission. But to the question of the amount of return on capital, we are not progressing at all; that is, the rate of dividend which shall be allowed; and to my mind there are two classes of returns which should be considered, namely: First, we should determine whether the dividends should be the maximum dividends of the year or the maximum average. The Commission has, I think, in Newburgh, ruled against the maximum average dividend of 8 per cent. It may be that in one year 8 per cent. should be earned, but a distinction between these two forms of dividend must be settled. If 8 per cent is determined upon for one, some other rate should be fixed for the other.

Mr. Horton—The point brought out by Mr. Burdett last night should be considered; namely, should we try to fix the income of our dividends, or should we confine ourselves to some one rate of dividend?

The President—I think much could be accomplished if the new officers could take this up with the Commission and make a study of the subject, as to the interest which should be paid on an investment. Mr. Sheehan made the good point that the Commission is open to conviction. Its members have met us fairly and squarely. Commissioner Stevens said at Albany they had met with considerable difficulty in trying to carry out the provisions of the law. I think it is up to the members of this Association to assist them, to give them the information necessary and persuade them along the right lines if we can, before they become biased through other interests which will be brought to bear upon them.

Mr. Beal—The present purpose is not to urge the question of a maximum dividend too much. I think it is pretty certain the Commission has many problems on hand. If this question were forced this time might it not turn out that many companies would be found that are not paying on any basis, then the question would come up of what an overcapitalized company can earn on its stock, and if it can earn 10 per cent. on its stock, whether an undercapitalized company can earn 20?

The President—If there are no further remarks, we will hear Mr. Davidson.

Mr. R. A. Davidson here read the

REPORT OF COMMITTEE ON INSURANCE.

Mr. Chairman and Gentlemen: Your Committee has held several meetings and interviewed a number of insurance experts with the idea of perfecting a plan for bettering insurance conditions among the members of the Association. After considering the subject of mutual insurance, we feel this cannot be successfully presented at the present time, but any action which would enable the companies to combine upon a scheme for cheaper insurance would be a step toward the future development of a system of mutual insurance, through some central agency, to obtain a uniform rating and uniform methods of inspection. In this connection we present the following ideas of an insurance expert who has had a large amount of experience in this line. In connection with the handling of insurance for various corporations' interests, it has been deemed desirable by the insurance companies to perfect an organization for the following purposes:

1. For inspecting of properties in a thorough manner by engineers to pass upon desirable improvements.

2. To negotiate with the assured to secure the improvements, and where necessary to take actual oversight of such improvements.

3. To secure uniform rules and submit definite assurance of rates for the improvement affected.

4. To bring about closer relations between the organizations representing the assured and the insurance companies, and to co-operate with such organizations in the development of standards for construction and elimination of fire hazards, which will be satisfactory to all interests.

5. To secure uniform rulings on forms, and to assist the assured in placing their accounts in desirable companies not crippled by conflagration losses or affected by wilful violation of State laws or doubtful foreign ownership.

6. The magnitude of the entire subject and its growing importance render immediate action and careful consideration of the entire subject necessary by organization, as vitally interested as are electric and gas lighting combinations.

7. Detailed advice on all improvements and new construction should be furnished these interests without the same ownership having to consult through a dozen different channels; in other words, it is earnestly recommended that some one source of information be supplied them, through which they can discuss the various items suggested above.

The above is suggested as a brief outline for your Association, which it seems to me should be adopted as a suggestion to the insurance companies as proper methods of handling your business. We have also received propositions from insurance brokers looking toward a uniform inspection and rerating of risks.

We believe that without doubt some general scheme for placing insurance through a central source can be worked out which will greatly benefit the members of this Association, and looking toward that end we ask that this Committee be continued, and permission be given to obtain from the members of the Association the necessary confidential information to enable us to properly work out the details.

Respectfully submitted,
R. A. Davidson,
T. O. Horton,
L. W. Emerick,
} Committee.

Discussion.

The President—Is there to be any discussion on this important matter of insurance?

Mr. Cole—There seems to be to-day rather a chaotic condition among the insurance companies themselves. In addition to the State and other inspectors, one of the insurance companies is sending out independent inspectors to-day, and in many instances they are sending out men wholly incompetent to pass upon and make an electrical report. We have had a case like that in Elmira. One of the most prominent companies sent a young man to our plant. At the present time we are tearing out the whole department and putting in turbines and other things that go to make up a modern plant. The young

man sent there reported that our Company had temporary wires running to the switchboard which were connected with a battery; that the floors were all torn up and boxes were all over the place. He stopped there and didn't say anything about the fact that the station was being changed. We received notice from 5 or 6 companies right after that, that unless conditions were changed immediately, they wanted to close out with us. Our agents notified us absolutely not to let one of these men in our house to make such inspections, only to allow the State inspectors; and it has been after probably about 3 months of time we have been able to demonstrate the conditions existing at our station, and to have the companies come on and take up the insurance. The next point is, those inspectors will not take our books to see if the work of repair will meet with their approval. For 5 weeks I have been trying to get some one of them to go over our plant and the blueprints of our engineers, to see if they comply with the underwriters ideas, and not come around 60 days after the work is done and make us go all over the work again.

Mr. Horton—The conditions mentioned by Mr. Cole were brought to our attention, in the case of an electric light line. Before doing this sort of work, they had an electrical expert and an insurance expert come there, and the later worked this out. What your Committee had in mind was a rational inspection and uniform ratings on a uniform inspection.

Mr. Cole—In Poughkeepsie, where we were locating two transformers, the Inspector of the State approved our plants, but the fire underwriters' inspector next came and he condemned them. If it is in order, I move that a vote of thanks be extended to the Insurance Committee on the work which they have had in hand, and to move also that the report be accepted and the Committee continued, as Mr. Davidson suggests. [Seconded and adopted.]

Mr. Emerick—In order to avoid the matter of which Mr. Cole spoke, that is what the Committee is trying to do. The inspectors who come around are insurance people, who have summary reasons along the line of insurance for doing what they do. They do not care about the engineering end with which we have to contend. There is no question that this can be handled in future by men who, while not insurance people, are technical men, and who have no insurance interest in it. That is, people looking at it from our side of the fence first; then it should go to the insurance people.

(To be Continued.)

[Concluded from Page 715.]

Depreciation.

[A paper prepared for and read before the Second Annual Meeting of the American Gas Institute (Washington, D. C., Oct. 16 to 19), by A. C. HUMPHREYS, President Stevens Institute, Hoboken, N. J.]

Prof. Bemis is an extremely adroit and resourceful witness, but to support Prof. Marks' estimates on structural values and depreciation seemed to be a task beyond even his powers. But he made a plausible effort, for in the quotation last made from Bemis' testimony, he attempts to back up Marks' 33⅓ per cent. depreciation by showing that his 5 cents a thousand allowance for depreciation, equal to about 1 per cent. on Marks' valuation before deducting for depreciation, would in about 20 years amount to about 33 per cent. of that valuation. Thus he attempts to apply an estimate on depreciation for the future to a past period, disregarding all elements of repair and renewal and money put into plant, the fact being that the plant had been to a great extent "restored" about 8 years before in connection with consolidations of three companies. Thus Bemis' testimony shows the fallacy of his reasoning as to life of plant, as he makes the life vary with the assumed rate of sinking fund interest—that is, 5 per cent. fund, 20 years life—4 per cent. fund, 21 years life—(actually the sinking fund calculation makes it more than 21 years).

Here it is evident how Bemis as a statistician confuses the variation due to sinking fund provisions for payment with the estimate on average working life which must precede all calculations as to methods of financing and which is not affected in any degree by variation in these methods. This point of average life I shall refer to again.

These gas hearings may well be referred to to make clear another point in connection with estimates on depreciation which has to be kept in mind in connection with our accounting and especially when we are under fire. We must remember that in all probability the tribunals before which we must defend ourselves, even though they may be anxious to render a fair judgment, will be handicapped by lack of information on the question at issue and perhaps particularly so as to this question of depreciation which is intricate and, because it has to do with the future, is at the best necesessarily a matter for expert judgment and estimate. Hence the way is open for plausible statements and arguments which are far from representing the facts as I have already shown. We must then be prepared to show the fallacies of the testimony brought against us. We must be prepared to find the same witness magnifying the depreciation when estimating the value of plant and minimizing it when attempting to show a low cost for gas at the burner. As an example, in the New York Consolidated Gas case before the Master, Marks testified that no accountant's figures of cost, etc., should be accepted unless the work had been supervised by one skilled in the business. The parties opposed to the Gas Company were assisted by a firm of chartered accountants and their work was checked up, or said to be, by an advisory Board of Engineers, of which Marks was a member and apparently the controlling spirit. This Board recommended a rate to be charged for depreciation in making up cost of gas, which was based upon a single entry for an isolated period and, as such, approved by the Company's Board of Directors. The Advisory Board approved this schedule as generally applicable, on the ground that the Directors had themselves declared the facts.

The lump sum approved as to manufacturing plant on this occasion and for the particular purpose in mind, amounted to .02 per cent. of the book value - or in other works, *allowed for a life of* 5,000 *years.* On the whole plant .8 per cent. was approved, which allowed for an average life of 125 years. And yet in testifying as to plant values Prof. Marks had been quite liberal in his estimates of depreciation.

The point I now wish to cover has to do with the comparison between present values of plant and estimates in depreciation.

In the Holyoke case I was asked a number of questions along this line: If you estimate that a certain piece of apparatus has a life of 50 years, is it not true that it will be worth only 50 per cent. of its original value at the end of 25 years?

In the Buffalo case, Prof. Bemis attempted to show by my Holyoke testimony that there must be this proportionate decrease in value although, in that testimony, I had denied the proposition and had clearly shown that such was not necessarily nor probably the case.

The attempt was also made to put my testimony in conflict with that of Mr. A. E. Forstall, who had testified for the Buffalo Company as to structural values.

Mr. Forstall's appraisal was based upon present condition of plant as he found it after painstaking detailed examination.

Such examination at once told him as a qualified expert whether the apparatus was inadequate or obsolete. If not deficient in either of these particulars, then he valued it according to its present structural and working condition. As I understand, he worked upon the theory that inadequacy and obsolescence are the two elements of depreciation most difficult to correctly estimate when looking into the future but, by one properly qualified, easily determined at the time by examination; and when looking at the plant itself to determine present value, if the plant is not obsolete and not inadequate, the problem resolves itself into one of straight appraisal for the duty in hand. As to whether the plant will be obsolete or inadequate 10 or 15 years from then, he is not called upon to determine, though, if making an estimate for the future on depreciation, he would consider these items and make such allowance as his experience seemed to call for under all the conditions to be observed and apprehended.

Let us for a moment consider the three chief elements to be included in forming an estimate as to future depreciation whether on new or old plant. But, first, it should be borne in mind that no matter what estimate or table is made up, the figures should be revised from year to year as we expect to do with any estimate extending far into the future. The three elements leading to the loss of value which we rather loosely denominate as depreciation are: Obsolescence, Inadequacy, Physical Decay.

The first may become a very serious item as has been found in the electric lighting business, and its neglect has led and may lead to many passed dividends.

Inadequacy is also important and hard to cover by estimate. Here comes in the question of original layout. The plant may have been designed to meet present needs and honestly constructed but manifestly inadequate for any large increase in business. Some inadequacy we are sure to encounter sooner or later, unless the plant was originally laid out on a scale not warranted at the outset of the enterprise. We are continually having to meet the question of inadequacy in our distribution systems. While some mains may remain more than ample in capacity, others are found to be inadequate. In other words, the business has developed as a whole, and in some districts has de

veloped along lines as we did not expect, leaving us with a surplus capacity in directions we had estimated for too liberally. Finally we have physical decay. Unfortunately layman and some accountants are too apt to think that this last is the only item to be really considered. Here comes in the theory that if you have assumed for the future a certain average life of plant, you can carry that estimate back over the past and make it apply to present values of plant by simply determining the expired average life and so establishing a ratio of depreciation to apply to the plant as it at present exists. Nothing could be more fallacious. If the depreciation estimate had been the same as that now adopted, it would still remain to analyze its contents and compare item by item with the facts as found by experience and by examination of the plant and accounts. For instance, we might have esttmated an average life of 50 years for the mains, taking into account the question especially of inadequacy; but when we come later to apply that estimate to the present condition of plant, we might find that the business had not developed as had been assumed, that the growth had been along lines not before contemplated, and that these districts had been covered by new mains and that the mains as originally laid were still adequate, and being cast iron pipe, well laid, they were not obsolete, and showed practically no physical decay, the condition as to joint leakage, etc., having been maintained by efficient current repairs.

Buffalo furnishes a striking example of elimination of inadequacy as to mains, for the natural gas competition had reduced the output in 1906 to about 636,000,000 cubic feet a year, distributed through 381 miles of main.

Furthermore, any unamended original estimate will be upset by reinvestments of depreciation fund in new plant for extensions; while if depreciation is cared for by sinking fund, the working value of plant is not necessarily the original value minus the estimated depreciation, as that would mean that depreciation is evenly spread and evidenced over all the years of plant's life. If such were the case, there would be no need of any estimates in connection with depreciation.

On the other hand, plant might be found which was in perfect physical condition, but which was greatly reduced in value by reason of obsolescence or inadequacy.

Here is where the appraisal of a plant by a man really expert in the business, expert as a constructor and an operator, comes in to clear up questions to date. Such an appraisal can give the actual present value with regard to obsolescence, inadequacy and physical decay. As to the two first elements, the expert can, through the exercise of his trained judgment, in connection with a study of the plant and the business, arrive at the truth. As to the last element, he may not be able to see all working and hidden parts, but by a thorough examination of the plant, supplemented by a close scrutiny of the methods followed in operation, including repairs and current renewals, he can very closely appraise the value as to this element.

Having disposed of the elements of obsolescence and inadequacy, a man really expert as a constructor and operator may well discover that certain of the parts of plant, although erected some years before, are as good as new, and in some special cases he may find parts which he would prefer to the equivalent apparatus then purchasable. And still there is absolutely nothing in this statement in opposition to the proposition that provision should be made for equalizing, as far as possible, the cost of depreciation over all the years involved. Anything like a full comprehension of this important and puzzling subject must at once convince that for its solution is required not only the best efforts of the thoroughly competent constructing and operating engineer and manager, but also the best efforts of the thoroughly competent accountant.

I have a great respect for the work done by many of the British chartered accountants and I think that we in the United States are to be congratulated that some of their ideals and methods are being imported for our benefit. We are also to be congratulated on the independent work being done by our own accountants. The security of our industrial undertakings is distinctly enhanced by the intelligent painstaking efforts of these men to develop systems of accounting which will give the whole truth. I hope the day is approaching when in the United States the services of the best of these men will be still better appreciated.

Ever since I have given special attention to this subject I have been interested in all that I could read on depreciation from the pens of British chartered accountants. Deservedly prominent among these men is chartered accountant—now Professor - Lawrence R. Dicksee. In the April 16, 1907, issue of the *Journal of Gas Lighting* appears an abstract of a lecture delivered by him before the Chartered Accountant Students' Society on "Depreciation, with Special Reference to the Accounts of Local Authorities." Part of this lecture might very well receive the careful attention of those engaged in making comparisons between private and municipal control of public utilities. For instance, quoting from the abstract:

"At the outset the lecturer directed the attention of his audience to the importance attaching to the subject, because while on the one hand, the finances of local authorities are asserted to be in an 'absolutely rotten' condition, it is urged that so long as the authorities comply with their statutory requirements, and set aside annually out of their revenue a certain amount to form a sinking fund to provide for the eventual repayment of their loan capital, they have done all that is necessary, and even more than is attempted in most proprietary businesses."

Again –

"At the same time, by definitely ear-marking from year to year gross profits which in all fairness ought to be set aside to provide for future expenditures, it becomes possible to provide reasonable reserve for contingencies, thus avoiding the fatal policy of reducing prices to a level which it will be impossible to maintain in future years, when heavy expenditure for renewals has to be provided out of revenue because no borrowing power can be obtained."

As I wish particularly to bring to your attention a table introduced by Prof. Dicksee, let me quote a few short passages to put you in touch with his line of thought.

Quoting again from the abstract:

"He then proceeded to consider his subject, and began by explaining the term 'depreciation' as meaning the loss or shrinkage in value that inevitably occurs from time to time in the assets which represent the capital equipment of a business, as a result of their employment therein; this loss being attributable to wear and tear, lapse of time, the march of modern invention, or to any or all of these causes combined. He pointed out that this shrinkage in value must be looked upon as a working expense of the business, in just the same way that the hire of assets would have to be regarded if the use of them had merely been required for short periods, instead of capital having been expended in the acquisition of them. * * * * * *

"So that, at all events, by the time an asset is discarded, a sum equal to its original cost, or the cost of replacing it by another asset equally efficient, shall be charged against revenue, and thus the proper charge shall be borne by the revenues of a series of years, even though there may be inequalities in the apportionment of the charge as between one year and another in the series."

After discussing depreciation in connection with the issue of loans by a local Government Board, he points out:

"From these particulars, it will be seen that the average effective life (estimated working life less residual life) of the undertaking as a whole works out as nearly as possible 48½ years; and upon this basis a loan would in all probability be granted for 48 years, or thereabouts. But, upon comparing the loan period with the column showing the effective life of each class of asset, it will be found that in no single instance do the two correspond. In some cases the working life is very considerably greater, while in others it is very considerably less; and in no single instance is it even approximately the same."

Before passing on to the Dicksee life table, let me call attention to another article on depreciation as it appears in the April 23d, 1907, issue of the *Journal of Gas Lighting*, being an abstract of a paper read before the Institute of Directors by Chartered Accountant P. D. Leake.

He defines "depreciation" as "expired outlay on productive plant" and productive plant as "all perishable material property owned by an undertaking other than that primarily intended for sale."

"The factor of depreciation constitutes a very large part of the operating expense of most industrial undertakings; and the hopeless state of chaos into which it has drifted constitutes a grave public danger, which is even assuming the dimensions of a national danger in these days of municipal enterprises."

This last quotation confirms what we all have suspected and many of us have known, namely, that the truth as to municipal trading in Great Britain does not lie upon the surface.

In the following table I first reproduce the figures exactly as they appear in the Dicksee article; then I add a column to show how the author arrives at his "average life" of 48½ years; then I add two tables of my own based upon the data supplied by Dicksee's table, in which I give the true average life and the number of years required for a certain annuity to accumulate to an amount equal to the first cost of plant, provided no withdrawals are made. This last is not a true average life, as will be explained.

From Prof. Dicksee's paper it would appear that the method generally followed in Great Britain in averaging the life of a plant in connection with depreciation is that employed in the table here reproduced.

"Average Life" Table from Prof. Lawrence R. Dicksee's Article as Abstracted in London Journal of Gas Lighting, April 16, 1907, with Additions and Modifications by Alex. C. Humphreys, based upon Dicksee's Assumed Data.

Class of Asset.	Dicksee's Table. Estimated Life Years.	Residual Value Per Cent.	Effective Life Years.	Amount of Expenditure. Per Cent.	A. C. Humphrey's Proof of Dicksee's Computation of "Average Life."	Modified Tables by A. C. Humphreys. For Reinvestment in Plant. No Interest. Number of Times Each Class of Asset Renewed. In 100 Years.	Total Renewal Expenditure in 100 Years. Per Cent.	Amount Years Effective Life Multiplied by Total Renewal Expenditure.	For 3½ Per Cent. Sinking Fund. Required to Redeem 1 0 at End of Years Given.	Amount Required Each Year to Redeem 1 0 Worth of Mixed Assets.
Land	100	..	100.0	4.00	.04 × 100 = 4.0000	1.00	4.00	400.00	0.11593	.0011593 × 4.00 = .0046372
Buildings	80	..	80.0	14.00	.14 × 80 = 11.2000	1.25	17.50	1,400.00	0.23849	.0023849 × 14.00 = .0333886
Foundations	100	..	100.0	10.00	.10 × 100 = 10.0000	1.00	10.00	1,000.00	0.11593	.0011593 × 10.00 = .0115930
Boilers	25	5	26.3	5.00	.055 × 26.3 = 1.4465	3.80	20.90	549.67	2.379	.02379 × 5.50 = .1308450
Dynamos	30	8	*32.3	6.00	.06 × 32.3 = 1.0380	3.10	18.60	600.78	1.717	.01717 × 6.00 = .1030200
Engines and machinery	25	6	26.6	21.50	.215 × 26.6 = 5.7190	3.76	80.84	2,150.34	2.338	.02338 × 21.50 = .5026700
Cables	35	15	41.2	32.00	32 × 41.2 = 13.1840	2.43	77.76	3,203.71	1.120	.01120 × 32.00 = .3584000
Arc lamps	12	5	12.6	1.20	.012 × 12.6 = .1512	7.94	9.53	120.08	6.451	.06451 × 1.20 = .0774120
Arc lamp posts	40	5	42.1	1.00	.01 × 42.1 = .4210	2.37	2.37	99.78	1.075	.01075 × 1.00 = .0107500
Accumulators	15	10	16.6	.20	.002 × 16.6 = .0332	6.02	1.20	19.92	4.545	.04545 × 0.20 = .0090900
Motors	25	9	27.5	.55	.0055 × 27.5 = .1512	3.64	2.00	55.00	2.222	.02222 × 0.50 = .0122210
Office furniture	15	5	*15.5	.30	.003 × 15.5 = .0465	6.45	1.94	30.07	4.969	.04969 × 0.30 = .0149070
Meters	12	2	*12.3	3.40	.034 × 12.3 = .4182	8.13	27.64	339.97	6.645	.06645 × 3.40 = .2259300
Accessories and instruments	12	2	*12.3	.15	.0015 × 12.3 = .0185	8.13	1.22	15.01	6.645	.06645 × 0.15 = .0099675
Tools, etc	10	5	10.5	.20	.002 × 10.5 = .0210	9.52	1.90	19.95	8.045	.08045 × 0.20 = .0160900
				100.00	"Avg. Life" = 48.7483		277.40	10,004.28		1.5209213

"Average Life" as computed by Prof. Dicksee from his assumed data, 48¾ years. *If Prof. Dicksee's method of computing "Effective Life Years" is understood it seems that the figures "starred" should be respectively 32.6, 15.8, 12.2, 14.2.

Dividing the total of "amount years" by total renewal expenditures in 100 years 1,0 04 28 ÷ (277.4 we find the true average life to be 36.06 years.

Say 1.52 per cent which on a 3½ per cent Sinking Fund represents an "average life," or more correctly, an average redemption period of 34¾ years instead of 48¾ years.

It is particularly to be noted that the author himself points out how the "average life" thus found *fails to provide for the renewal of the several classes of assets as their individual life periods expire.* This should at once be convincing that the "average life so obtained is not safely to be employed. A study of the complete table will show that the methods followed in my two modifications of the Dicksee table do give averages which provide for the renewal of each class of asset as its individual life period expires, whether the method of financing the depreciation loss be by the sinking fund or direct reinvestment in plant extensions; and that in both cases the withdrawals, necessarily required by the assumed terms of the life table, do not interfere with the scheme as a whole. The reason for this difference is that in my table the case of each class of asset is considered by itself and the total yearly requirement is the sum of the separate requirements. This will perhaps be made still plainer in some tables which follow.

It is evident to any practical man who has really studied the subject of depreciation that no general rules can be followed in the preparation of a depreciation life table, for necessarily this is in each case a matter of estimate based upon an expert consideration of present conditions as to character and condition of plant and future conditions as to care of plant, methods of accounting, changes in the art and growth of the business; and as to the future, in addition to probable physical deterioration, as before said, we must particularly consider the probable effects of obsolescence and inadequacy. Furthermore, the table as originally made up should be modified and corrected as conditions demand from year to year.

These being the facts, it is all the more important that the life table as mathematically developed should correctly represent the assumptions included in the general life estimates, and that we should not add to our difficulties by introducing errors of theory.

In the life table just given I have shown that the so-called average life as given in Prof. Dicksee's article, and as frequently employed in accounting practice, does not give a true average life. The fact is that no sinking fund scheme gives a true average life, *although if correctly computed* the so-c lled average life closely corresponds to the true average life. In what follows I wish it to be understood that, when I say true average life, I mean correctly computed on the assumptions made. I do not mean that the average life as so computed is in any case more than an estimate based upon expert knowledge and experience.

The differences as to what may be considered the average life of a plant, as exemplified in my analysis of the Dicksee table, are of such vital importance to an understanding of this subject that I shall venture to quote at length from the supplement of my lecture notes on the "Business Features of Engineering," as used with my classes at Stevens Institute of Technology. This particular point so repeatedly puzzled the members of my classes that I wrote this supplement in the effort to clear up the difficulties experienced, which is practically as follows:

SUPPLEMENTAL NOTE ON DEPRECIATION.

April 15, 1905.

On page 117 of "Lecture Notes on Some of the Business Features of Engineering Practice" appears the following:

"It is well here to draw attention to a mistake which is sometimes made in estimating the average life of a plant. Take the case we have already considered and the calculation might be as follows:

Part of Plant.	Years		Value of Parts in Dollars.		
A	10	×	25,000	=	250,000
B	15	×	50,000	=	750,000
C	25	×	100,000	=	2,500,000
D	35	×	150,000	=	5,250,000
E	50	×	175,000	=	8,750,000
			500,000		17,500,000

17,500,000 ÷ 500,000 = 35 years average life."

(If the average life of the plant were as long as 35 years we find by referring to the annuity table that it would require only 1.358 per cent. of the total value of the plant, that is, $6,790, set aside each year at 4 per cent. compound interest to rebuild the plant as a whole at the end of the 35 years of life.)

I then show, step by step, that $6,790, the amount that would be sufficient under a 4 per cent. compound interest sinking fund plan to redeem $500,000 in 35 years, if left undisturbed, would not be sufficient to provide for the renewals of the several parts of plant in accordance with the assumed life table.

Although this part of the subject was so covered at considerable length, I now find that it is advisable to go further, and especially to answer two questions which have been asked.

Some say: "Why should anyone expect such a calculation to give the average life?"

Others say: "While it is apparent that this process does not give the correct result, why does it not do so?"

As to the first question, I can only suggest that those who have fallen into the error have done so by confusing this case with other cases not so complex.

For instance, if we had 25,000 castings weighing 10 pounds each, 50,000 castings weighing 15 pounds each, 100,000 castings weighing 25 pounds each, etc., we could find the average weight of the 500,000 pieces by the process shown on page 117. Or, if we had 25,000 yards of cloth costing 10 cents a yard, 50,000 yards costing 15 cents a yard, 100,000 yards costing 25 cents a yard, etc., we could find the average cost per yard by the same process.

This answer replies to the first question, but makes the difficulty of those asking the second question all the greater; they now say, "If

this calculation is correct in the case of averaging weights, costs, etc., why is it not correct for averaging the life of a plant?"

The reply is that the process would be correct if it covered all the elements of the proposition and was correctly applied.

To better follow the several points involved, let us consider this process of averaging in the case of a plan for meeting depreciation *without the aid of interest accumulation.* In this case, if certain parts of the plant valued at $25,000 are to be renewed in 10 years, then each year we must lay aside to meet the depreciation of these parts $\frac{1}{10}$ of $25,000. And so we would require $\frac{1}{15}$ of $50,000, $\frac{1}{20}$ of $100,000, etc. The total amount required each year would then be $17,619, derived as follows:

$\frac{1}{10}$ of	25,000 =	2,500
$\frac{1}{15}$ of	50,000 =	3,333⅓
$\frac{1}{20}$ of	100,000 =	4,000
$\frac{1}{35}$ of	150,000 =	4,285⅞
$\frac{1}{50}$ of	175,000 =	3,500
	500,000	17,619

But if the correct average life were 35 years, the total amount required each year would then be (omitting interest, remember) 500,000 ÷ 35 = $14,285.71.

Now let us see why 35 years, and $14,285.71, derived therefrom, are not correct.

If we are to find the average life of the plant, we must state our proposition so as to include all the dollars involved in the full 50 years period. For instance, during the 50 years we have to take care of Parts "A," $25,000, five times, for these parts have to be renewed every 10 years. So for all parts we shall have to consider the number of times they will have to be renewed during the 50 years period.

Bearing this point in mind, the proposition stated on page 117 of the Notes will then take this form:

TABLE "A."

1	2	3	4	5	6
Part of Plant.	Years.	Value of Parts in Dollars	Times Renewed in 50 Years Period.	Total Requirement in 50 Years Period	Dollar-Years Being amounts in Column 2 multiplied by Amounts in Column 5.
A	10	25,000	5	125,000	1,250,000
B	15	50,000	3⅓	166,666⅔	2,500,000
C	25	100,000	2	200,000	5,000,000
D	35	150,000	1⅔	214,285⅞	7,500,000
E	50	175,000	1	175,000	8,750,000
		500,000		880,952	25,000,000

In explanation of above table it is seen that, having calculated the total number of dollars required during the 50 years for each class of plant, we then in each case multiply by the number of years during which each dollar (or the plant which the dollar pays for) does duty. Thus we obtain the results shown in column No. 6, namely, the "dollar-years."

Dividing now the total dollar-years by the total dollars to be provided during the 50 years, we have 25,000,000 ÷ 880,952 = 28.3783 years, as the true average life of the plant represented originally by $500,000.

If our result is correct, the amount required each year to cover depreciation (omitting interest) should be the total number of dollars to be supplied during the 50 years divided by 50—that is, 880,952.38 ÷ 50 = $17,619; and it should also be the original value of plant divided by 28.3783, the average life of plant; that is, 500,000 ÷ 28.3783 = $17,619. And, without considering the question of average life, we have already found that to replace each year $\frac{1}{10}$ of $25,000, $\frac{1}{15}$ of $50,000, $\frac{1}{20}$ of $100,000, $\frac{1}{35}$ of $150,000, and $\frac{1}{50}$ of $175,000 requires $17,619.

So we find that if the process *indicated* on page 117 is correctly stated, performed and applied, we get a true average life of 28.3783 years, requiring an annual payment from profits of $17,619, to provide for depreciation without interest accumulations.

To guard against possible misconception as to the so-called average life of plant in connection with the sinking fund method of providing for depreciation, we may well consider in a little more detail the difference in this respect between the compound interest sinking fund process and the direct method in which is set aside each year the actual amount of estimated depreciation.

In the case we have been considering—referring to page 116 of the "Notes" and Table "B" to follow—we find that the amount required to care for depreciation of the $500,000 by the 4 per cent. compound interest sinking fund scheme is $10,163.50 which is 2.03 per cent. of the $500,000; and this 2.03 is almost exactly the per cent. required to redeem the *total original* cost of the plant in 27¾ years, *provided the sinking fund is not disturbed* (in the original "Notes" I say about 28 years, but 27¾ years is more exact); and furthermore, this per cent. is sufficient to pay for the recurring renewals of the several parts, "A," "B," "C," "D" and "E," in accordance with the life table assumed.

But we have seen by the calculations made in these supplementary notes that, by the direct method of setting aside each year the actual amount of depreciation, the true average life is 28.3783 years. In this particular case these two figures, 27¾ and 28.3783, are so nearly the same that one might be led to suppose that they should be in actual agreement, and that the difference is due to lack of exactness in the compound interest calculations. A little thought will show that an agreement should not here be looked for.

In the direct method we are arriving at a true average life—that is, the "average life" is the *number of years elapsed when the plant will have depreciated an amount equal to the first cost*, and hence necessarily the number of years when the accumulated payments to cover depreciation will have amounted to the first cost of plant.

Whereas, in the compound interest sinking fund scheme, the average life (if we permit ourselves to use this term) simply means the number of years required for a certain annuity to accumulate to an amount equal to the first cost of plant, *provided no withdrawals are made;* the amount of this annuity with its interest accumulations being such, however, that when, from time to time, it becomes necessary to make withdrawals to cover depreciation in accordance with the provisions of the scheme, there will always be found in the fund a sum sufficient to meet these recurring demands.

By the direct scheme (no interest) the accumulation of annual payments in the fund must necessarily be equal at the end of any year to the accrued depreciation. By the compound interest scheme this necessarily would never be the case unless a time was reached when all the parts of plant expired at the same time.

For instance, in the life table now under consideration, there is always an overlapping of the life periods of the several parts of the plant, and so there will never be in the fund sufficient to meet the total *accrued* depreciation, though *there will always be enough to meet the requirements as to each part of the plant as it has to be renewed.* This means that when this overlapping of life period occurs, as it probably always would in practice, the compound interest sinking fund scheme, strictly speaking, is only applicable to the case of a plant operating in perpetuity.

To illustrate: On pages 122 and 123 of the "Notes" it is shown that by the sinking fund scheme we should have in the sinking fund at the end of 50 years, after making all payments required for the renewals of parts "A," "B," "C," "D" and "E," $54,195. The calculations are then made to show what should be the accrued *sinking fund liability* on account of the depreciation of parts "B" and "D," the only parts the lives of which overlap the 50 years included in the table. It is shown that the 5 years' sinking fund liability on parts "B" and 15 years on parts "D" will amount to $54,312, being practically in agreement with the balance shown in the fund.

But this is *not* the actual accrued liability for *depreciation*, at the end of 50 years, which would amount to

"B" — 15 years' life, $50,000; 5 years accrued,
$50,000 by $\frac{1}{3}$ = $16,666.66

"D" — 35 years' life, $150,000; 15 years accrued,
$150,000 by $\frac{3}{7}$ = 64,285.71

$80,952.37

It is thus seen that the compound interest sinking fund scheme, and the simpler scheme, which eliminates interest accumulations, are essentially different in operation. In connection with the sinking fund scheme the term "average life" is misleading, whereas, by the direct scheme the true average life, if desired, can be determined by the method shown in this supplementary note.

To further illustrate that the true average life (as far as it can be true, based upon estimate) will not be the same as the time during which a sinking fund scheme, if undisturbed, will accumulate the total value of plant, we may add a 2 per cent. and a 6 per cent. sinking fund scheme to the life table already used. To make the comparison more apparent, I will include in the one table these two schemes, the original 4 per cent. scheme and the direct scheme which entirely eliminates interest:

TABLE "B."

Parts of Plant.	Estimated Life in Years.	Value of Plant in Dollars.	Amount to be Set Aside Each Year to Cover Depreciation. 6 Per Cent. Sinking Fund.	4 Per Cent. Sinking Fund.	2 Per Cent. Sinking Fund.	0 Per Cent. No Interest.
A	10	$25,000	1,896.75	2,082.25	2,283.25	2,500.00
B	15	50,000	2,148.00	2,497.00	2,891.50	3,333.33
C	25	100,000	1,823.00	2,401.00	3,122.00	4,000.00
D	35	150,000	1,345.50	2.037.00	3,000.00	4,285.71
E	50	175,000	602.00	1,146.25	2,068.50	3,500.00
Total value of plant and total annual payments		500,000..	7,815.25	10,163.50	13,365.25	17,619.04
Annual payments in per cent. of plant value		.....	1.563	2.03	2.673	3.524
Years required to redeem total value of plant		.....	27.05	27.73	28.2	28.378

It is thus seen that as the interest rate of the sinking fund increases not only will the annual depreciation payment be reduced in amount but, if we stipulate that in the meantime no withdrawals shall be made as in fact called for by the life table then the time required to accumulate the total value of plant will also be reduced.

This seeming contradiction is the result of this stipulation, necessarily introduced for this time comparison. For we must remember that the amounts actually withdrawn to meet partial depreciations ("A," "B," "C," "D" and "E"), in accord with the life table, will be the same, no matter what the sinking fund rate of interest; and as we assume that these amounts are to be left in the fund and allowed to accumulate, the higher the rate of sinking fund interest the greater will be the tendency of these accumulations to reduce the time in which the total value of plant will be produced.

It is true that there is another factor involved in this comparison of so-called average lives, though no reference to it is apparently called for by the comparative figures above given. So where the factor just explained tends to shorten the so-called average life, this second factor here tends in a minor degree to lengthen it.

That is, the higher the sinking fund rate of interest, the smaller will be the *sinking fund* liability for each part between the several withdrawal dates; therefore, the slower the accumulation and a consequent tendency between withdrawal dates to lengthen the so-called average life. While this tendency ceases for each part at its withdrawal date, the tendency is always in force with some of the parts, and therefore always affects the scheme as a whole.

I may avail myself of this opportunity to answer another question which seems to have puzzled a number of the class: "Why complicate the problem of depreciation with questions of compound interest; why not each year take out of profits for plant which will have to be renewed in 10 years, $\frac{1}{10}$ of its cost, for plant which will have to be renewed in 15 years, $\frac{1}{15}$ of its cost, etc., and then let the interest on the depreciation fund be absorbed year by year into the profits?"

This is exactly the case I have covered in the sixth paragraph, page 129, beginning: "The simpler and more usual arrangement." I also refer to this plan on pages 138 and 139. The objection is the larger amount required in the first instance to cover the annual depreciation charges.

We have seen that by the more direct method it would require $17,619 a year taken out of profits, whereas by the 4 per cent. sinking fund scheme it would require only $10,163.50; that is, 3.524 per cent. of the cost of plant instead of 2.03 per cent. of cost.

This difference might prohibit the adoption of the simpler plan, especially in the early days of a new venture.

I am chiefly concerned to convince you that depreciation should be provided for out of profits, and I have therefore shown the necessity of accurately estimating the depreciation and the manner in which the means may be provided for meeting the item of loss with the least burden to the business.

Let me also emphasize the point that *if* a certain portion of the profits are, year by year, invested in plant extensions to cover depreciation, we must be careful to keep our accounts so that there will be no excuse offered for issuing additional bonds or capital stock against these additions to plant, for by this method we have simply made good the depreciation of certain parts of plant by adding other parts.

As far as gas companies' practice is concerned, too much stress has been laid upon the sinking fund method of financing depreciation. I confess that I may have erred in this direction. In my address as President of the American Gas Light Association (1899), I laid particular stress upon the necessity for some systematic provision being made to meet depreciation and I then discussed the sinking fund method. I was partly led to this by the desire to interest those who might look upon the full burden as too heavy to be at once assumed. But in this case, as in every other in which I have written or spoken on this subject, I have never neglected to point out that, if the depreciation fund were reinvested in plant extentions, *the interest on these investments by one means or another must be added to the depreciation fund, so showing that the sinking fund payment was not the full cost of depreciation.* In my earlier efforts to arouse interest in this subject, I was more interested in the practical and engineering features of the problem and not so much in the accounting feature. I was then satisfied to state what I considered the principles which govern rather than to lay stress upon the details of accounting.

The table which I have here given in connection with my discussion of Prof. Bemis' methods of computation, shows clearly the effect of following the sinking fund method rather than the simpler and more straightforward method of setting aside each year for reinvestment the full amount of loss due to depreciation.

In my lectures to the students at Stevens I am instructing those who will in the future be interested in various lines of work, and therefore should be instructed as to the working of a sinking fund. Naturally, then, I lay stress in my instructions upon the more complicated methods of the sinking fund, simply because, by reason of the greater complications, the subject is harder to understand.

Attempts have been made to cover the subject of depreciation by tables showing the length of life for each class of plant. It is true that in some cases in connection with these tables warnings have been given to the effect that such tables are only of general value and should not be blindly accepted without regard to local conditions. Such tables are no doubt of some value when used by those competent to form independent judgments. I purposely omit all such data from this paper, for fear it may be claimed that I have stated that all brick buildings have a life of so many years, all wood buildings a life of so many years, all holders a life of so many years, etc. That this fear is warranted is shown by Prof. Bemis' use of my Holyoke testimony, in spite of the fact that I repeatedly stated that my figures could not be used in any general way, but had been adopted for Holyoke and Holyoke only, after a careful study of Holyoke conditions from the standpoint of the engineer, the manager and the accountant.

Arguments as to the cost of depreciation have also been based upon comparisons of costs per thousand of repairs and current renewals. As I have repeatedly stated, the cost of depreciation must be considered in connection with the declared cost of these items, but here any fair comparison cannot be made unless we have analyzed the character of the work performed and the methods of accounting followed in each case.

Let me summarize some of the figures tabulated by me in connection with recent cases in which I have been concerned.

In the case of 9 Massachusetts companies brought into one case, the repairs and current renewals for the year ending June 30, 1905, were as follows in cents per 1,000 respectively: 15.17, 10.32, 8.62, 26.73, 12.64, 22.11, 9.16, 6.88, and 15.10. In addition certain amounts had been written off for depreciation which brought the totals to the following: From 15.17 to 22.68, from 10.32 to 10.61, from 8.62 to 15.28, from 26.73 to 31.58, from 12.64 to 57, from 22.11 to 66.47, from 9.16 to 26.11, from 6.88 to 22.04, from 15.10 to 21.2. In one case, the second named, there had been also written off for reserve 2.39, bringing the total up to 17.

In the case of 7 Massachusetts companies, year ending June 30, 1906, the costs per 1,000 for repairs were found to be respectively: 18.58, 13.54, 12.68, 6.37, 10.19, 14.76 and 15.36.

Adding for depreciations charged up these costs were raised to: 22.85, 13.54 (no change), 18.19, 12 92, 15,90, 14.76 (no change) and 15.36 (no change).

These figures had to be obtained by an analysis of the companies' returns filed with the Commission as they could not be obtained from the published report of the Commission.

After making allowances for differences in physical conditions, these figures show by their wide variation that, in spite of the uniformity as to blank forms used and instructions given, the accounts were not kept along uniform lines.

The following figures show the cost of wear and tear, manufacturing and distribution plus meter repairs, but not including stove repairs, for the London Companies for 1904, as taken from Field's Analysis converted into United States cents by taking the English penny at 2.02 cents.

Gas Light and Coke Company, 11.88 cents, Commercial, 14.22 cents, South Metropolitan, 14.27 cents, average three companies, 12.87 cents, average of 12 suburban companies, 15.15 cents; combined average metropolitan and suburban companies, 13.33 cents.

For the year 1905 these figures were found to be 12.10, 13.96, 12.08, 12.27, 15.85 and 13.02 respectively.

Here less difference is to be found, as the accounts of the London Companies are more nearly, though not by any means absolutely, uniform.

Studying the returns of the 113 British companies covered by the "Gas World" analysis of accounts of Gas Undertakings for the year 1904-5, we find the maintenance of pipes, works and meters in cents per 1,000 (converted as before) to range from 4.28 to 25.55. There is one lower, namely, 1.92 for Wallasey District Council, but that does not cover maintenance of pipes or meters. The 4.28 is given for Macclesfield Corporation, the Wigan Corporation being almost as low, namely 4.34. Our municipal ownership friends would point to these and other figures in this table as showing the comparatively economical management of the municipally controlled works. Expert analysis would unquestionably demonstrate that the plants had not been properly maintained or the charges therefor had not been properly classified, or both.

For our present purpose it is sufficient to note that no comparison of costs of maintenance of any value can be made on the face of the returns.

There is a natural variation from year to year in the cost of repairs and current renewals and it would be a gain if this cost could be equalized over all years concerned; in other words, if we could have one scheme for so equalizing repairs, current renewals and final renewals; but at present it looks to me as if the additional complications would not compensate for the possible gain to be made.

Before closing let me say a word as to the necessity of creating a reserve, over and above depreciation reserve, to cover the fluctuations in prices of materials and labor, extra hazards of the business, contingencies which cannot be estimated on, such as electrolysis, etc. I think that gas companies should be permitted to build up a reserve fund for this purpose amounting to say 10 per cent. of their investment. I am strongly of the opinion that this reserve, by reason of its very nature, should not in any way be mixed up with the subject of depreciation; it is because it has been so treated in some notable cases that I here refer to the subject. The amount per 1,000 of this reserve should not be included as part of the cost, but should appear as a separate item in the accounts of such years as it has to be withdrawn from the income.

Let me bring this much extended paper to a close by summarizing some of the more important features to be considered in connection with this all-important subject of depreciation.

First, let it never be forgotten that any life table employed must of necessity be based upon estimate.

That being the case, the life table should be corrected and amended from year to year as required by changes in limiting conditions.

The estimate on each life period must be based upon consideration of probabilities as to obsolescence, inadequacy and physical decay.

The probable amount of physical decay will depend upon original design and construction and methods pursued as to maintenance.

In the life table each class of asset must be treated by itself and each class of asset must be provided for as to renewal and each repeated renewal within the period set by the longest life included in the table.

The cost of depreciation must not be confused with figures obtained by considering the financial methods to be employed in caring for depreciation. In any case the annual loss will be the total cost divided by the net total effective years of service.

If the loss is covered by a sinking fund, then the interest accumulations must be recognized as part of the cost, as shown by the table herein—"Result of Company Operating Its Own Sinking Fund." (Page 19.)

In considering and comparing costs per 1,000 of depreciation, the accounting methods pursued must be analyzed and applied.

Even when comparing given costs per 1,000 in the case of undertakings employing a uniform system of accounts, variations, avoidable and unavoidable, in applying the system will tend to affect the accuracy of the comparison.

The cost of repairs and current renewals must be taken into account in considering the cost of depreciation and, all other things being equal, the more complete the former the less costly the latter.

In conclusion let me recommend that the whole question of uniformity of accounts, including and emphasizing this most important subject of depreciation, be referred to a committee and that this committee be requested to confer with other representative bodies engaged in the same line of work.

[Continued from Page 717.]

FIFTEENTH ANNUAL CONVENTION, PACIFIC COAST GAS ASSOCIATION.

Held at Santa Cruz, September 17, 18 and 19, 1907.

Second Day—Wednesday, September 18th—Morning Session.

No discussion occurring on the "Experiences" submitted by Editor Valentine, the President called upon Editor George S. Colquhoun for the budget of

WRINKLES,

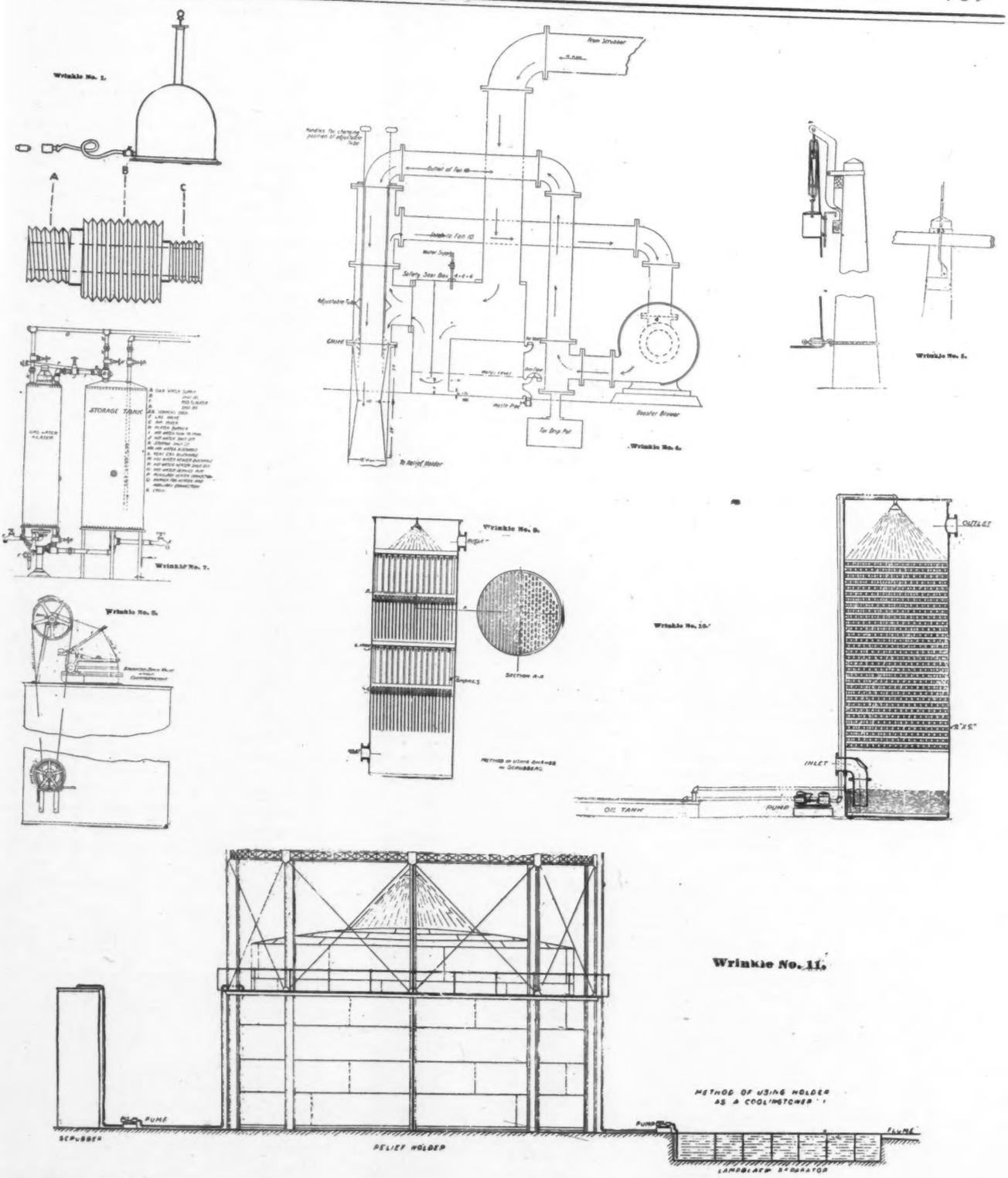
which that gentleman read as follows:

No. 1.—*Adapter for Meter Connections.*—The figure represents a fitting which we use in connection with blowing out services. It is so constructed that it will fit a 5 or 3-light meter coupling and can be reversed without any trouble to size desired. The connection is made to an inch coupling or reducer which is connected to the hose leading from the air pump. "*B*" represents the threads which screw into the coupling and leave exposed "*A*" 5-light meter connections or "*C*" 3-light meter connections, and by disconnecting the meter at the inlet and connecting the end of the fitting the service can easily be blown out. This does entirely away with removing the lead and carrying a lot of fittings to fit the desired pipe. The same fitting can be constructed for larger size meters.—H. B. Heryford.

No. 2.—*One Way in Keeping Peep Sights Clear.*—The peep sights on the generators are constantly giving trouble, owing to discoloration or breaking of the glasses. This trouble is doubly bothersome under such conditions as I experienced, where new glasses could only be obtained by having them cut to order at the rate of $6 per ½ dozen. The following remedy was adopted: The sight cock was removed and the nipple shortened; a gate valve, nipple and tee were then connected to the shortened nipple, and on the end was placed the sight cock, connected to the tee by a short nipple. We next ran a 1¼-inch pipe from the blast pipe of the generator and connected with the tee. In this way, by manipulating the above mentioned gate valve, we were able to ke p the peep sight free from soot and other obstructions. There was no more trouble from blurred or broken glasses.—R. P. Valentine.

No. 3.—*An Alarm for High or Low Pressure Mains.*—Where gas is distributed under high pressure an excellent arrangement for giving warning against undesired drops or rises in pressure is the following: Connect a U-tube with a pipe bearing the main pressure, the tube being partially filled with mercury. Arrange electric connections at either extremity of the U, so adjusted as to form a contact when the mercury rises to a certain point in one arm of the U, as the result of exceedingly high pressure, or in the other arm of the U as the result of exceedingly low pressure. The result of either contact is the ringing of an alarm bell placed in some convenient place. The contrivance, if properly set up and adjusted, is a safeguard against sudden and serious pressure variations."—R. P. Valentine.

No. 4.—*A Fan Exhauster Set Between the Scrubbers and Relief Holder.*—As a description, I will state that our object is to reduce the pressure on the scrubbers as much as possible, consequently reducing the pressure on the generators. To do this and avoid the possibility of too much of a reduction of the pressure on the wash boxes, we have installed a seal box which from its construction will not allow the pressure to be reduced on the scrubber to such an extent that the blast gases could be drawn in from the generator. It will be noticed that any reduction of pressure in the outlet of the seal box would raise the water in the outlet leg of the seal box to such a height as the booster blower could lift it but that the reserve water compartment will still keep the water line in the seal box at very nearly the same level, consequently no gas will be drawn through the box that has not sufficient pressure to break the seal. The booster blower as installed draws the gas from the seal box and discharges it through adjustable injector tubes to the relief holder. While this is quite a relief on the scrubber and generator to have this pressure reduced, there is still a greater advantage in that the fan of the blower by centrifugal force separates any particles of tar that are still in the gas after scrubbing, and in operation we find quite a deposit of very good tar in the drip pot. This removal of the tar at this point is quite advantageous as it is easily accomplished, easy to take care of and does not allow it to pass through the exhausters and purifiers. The seal box is also supplied with a water spray which not only keeps the water level at the



proper height but also gives an additional washing to the gas and a considerable amount of tar is also drawn from the bottom of the seal box. The blower is driven by a 3-horse power induction motor, but does not require that amount of power. The whole apparatus is perfectly automatic and requires only occasional attention.—R. L. CLARK.

No. 5.—*An Arrangement for Raising Transformers to the Top of Poles.*—The sketches show a little device which we use for lifting transformers to the crossarm, and which is self-explanatory.—GEO. C. HOLBERTON.

No. 6.—*A Steam Jet Ejector for Pumping Holder Drip.*—We have had some collections of naphthaline and lampblack and tarry substances at the inlet and outlet to the relief holder. We were often compelled to steam it up pretty thoroughly in order to be able to pump it out, but pumping the hot water out soon destroyed the leathers of the pump, and often required the services of a good man for half a day at a time to get the inlet clear. We put in steam ejectors of a home-made variety, and now the whole process is easy.—JOHN D. KUSTER.

No. 7.—*A Method of Storing Hot Water.*—The accompanying sketch shows a combination boiler connected to a large boiler in which hot water is stored, and then run to different fixtures about the building. Other details are shown by which two or three boilers may be attached, which would furnish an unlimited supply of hot water.

Two combination boilers attached to a 200-gallon storage tank are now being used in apartment houses, and furnish all the hot water required for 50 basins, 4 baths, and the wash trays. These boilers were installed after oil burners and coal heaters had failed to give satisfaction. Taking into consideration the cost of labor to attend and clean up after the other burners, gas has proven to be the most economical.—F. A. LEACH, JR.

No. 8.—*Balanced Stack Valve without Counter Weight.*—The above wrinkle was got up for use in operating a large and very heavy stack valve without the use of a counter-balance, and the advantage, as will be seen, is that the full weight of the valve is utilized against the pressure of the machine without raising the weight after the valve is let down, and is done with an ordinary large balanced valve, and it is free to act as a safety valve for any excess pressure. The counter-balancing effect is obtained however when needed in opening by the strain on the chain "*A*" exerting a force along the auxiliary arm "*F*" in its tendency to assume a position along the dotted line, thereby forcing it to act as a counter-balance on arm "*G*" and aids greatly in lifting the valve. As an illustration of the usefulness of the auxiliary arm, which lowers away from the chain and is out of the way when the arm is up, in an endeavor to lift the valve before the arm "*F*" was placed in position, two men had all they could do to shoulder it up by means of a hand wheel "*E*." The valve used was 43 inches in diameter, weighing 1,400 pounds and was handled without trouble by the operator.

No. 9.—*Method of Using Shakes in Scrubbers.*—The drawing represents a method of using ordinary shakes in scrubbers. The shakes are suspended in manner shown by inserting hooks in the 2 by 4 tray, and running a wire loop through the shake and hooking on to the screw hook. The water enters the top, as in any scrubber, the gas at the bottom, and as the shakes are in continual motion, consequently the gas receives very efficient scrubbing. This idea has been in use in California for a good many years, in this or slightly varying forms, but I trust it may be new and prove of some value to some of the members of the Association.—H. W. BURKHART.

No. 10.—*Oil Scrubber for Eliminating Naphthaline.*—This drawing represents what we term an oil scrubber. We have taken an ordinary scrubber shell placed 2 by 4 wood checkerwise therein, placed a dip pipe on the inlet, connected a pump with our oil tank, pumping the oil into the top of the scrubber, allowing it to percolate through the wood trays, the same as scrubber using water. The oil then overflows from the bottom of the scrubber into the oil tank, and thus circulates from oil tank through scrubber, returning to the oil tank. This is a very inexpensive and efficient method of eliminating naphthaline trouble.—H. W. BURKHART.

No. 11.—*Holder Used as Cooling Tower.*—Drawing represents method of using a relief holder as a cooling tower in places where the supply of water is insufficient or the rate very high. Water is pumped from the lampblack separator on to the top of the holder and discharged thereon in the form of a spray. Another pump takes the water from the holder tank, pumping it through scrubbers. There may be some objection to this arrangement, but, on the other hand, there are some conditions wherein this arrangement would result in a considerable saving.—H. W. BURKHART.

[To be Continued.]

High Pressure Distribution: Its Effect on the Illuminating and Calorific Powers of Gas.[1]

During the experiments upon the volumes of gas transmitted at different pressures through the gas main joining the factory at Riet with the town of St. Gall, in Switzerland, which were carried out during August, 1906, by Dr. Fliegner, tests were also made under the direction of Herr Zollikofer, the Manager of the undertaking, in order to ascertain whether the passage of the gas in the conditions already described produced any effect upon its calorific and intrinsic illuminating powers. A report upon the latter branch of the inquiry has been printed in the *Journal für Gasbeleuchtung*, from which we obtain the subjoined particulars.

A pair of Junkers' calorimeters and two photometers were installed; one of each being situated at Riet, close to the outlet of the blowing engines, and the others near the storage gasholder at St. Gall. The photometer was a Bunsen-Krüss instrument with a Lummer-Brodhun head. During the progress of the six different experiments under pressure and the one (No. 1) under natural draught, measurements of the illuminating power of the gas were made every hour at both ends of the main; three individual readings being usually completed for each test at St. Gall and five at Riet. Hollow-headed flat-flame burners were employed to develop the light. The burners were adjusted so as to consume as nearly as possible 150 liters (5.3 cubic feet) per hour; and the figures obtained were re-calculated for the stated consumption. The two calorimeters were kept running without interruption during the seven different main experiments. Determinations of the calorific values were made every hour at Riet and St. Gall; five being generally finished at the works and four at the holder end of the main during each experiment. Only net calorific value was estimated; but the readings were noted down both before and after reduction to 0° C. and 760 mm. of mercury.

The natural illuminating power of the gas at the works varied from 12.6 to 18.4 Hefners, and that at St. Gall from 14 to 18.4 Hefners. Its uncorrected net calorific value varied at the works from 534 to 575 B.T.U., and at the gasholder from 531 to 628 B.T.U. per cubic foot. On averaging the mean observed barometer readings during the seven complete experiments, the mean height of the mercury was found to be 20.5 mm. higher at Riet than at St. Gall; corrections for vapor tension, temperature, and capillarity increasing the difference to 20.6 mm. This difference was equal to 2.7 per cent. of the pressure at St. Gall, causing 100 parts by volume of gas at Riet to occupy 102.9 volumes in the high level holder at the same temperature. The photometric readings were not corrected for equal barometric height and equal temperature, because the primary object of the entire investigation was to study the properties of the gas as it actually existed and in the conditions in which it arrived at the place of consumption.

The general results of Herr Zollikofer's tests are reproduced in the accompanying table, where the seven experiments are arranged (as in Dr. Fliegner's article) in order of increasing pressure. The third horizontal line shows the average change in illuminating power of the gas in each experiment after its arrival at St. Gall expressed as a percentage of its original illuminating power at Riet. In experiment No. I., where the gas travelled upwards without mechanical assistance, it actually exhibited an increase in illuminating power equal to about ¾ Hefner; but in the other experiments it decreased a trifle, though the falling off was too small to be of practical import. It is possible that a slight drop in illuminating power may occur regularly when gas is forwarded through a main in the conditions prevailing at St. Gall; but this is a matter that can only be decided when the consumption has become large enough to necessitate a blowing engine being run continuously at such speed as to give a pressure of at least 100-tenths.

	IV.	I.	VI.	V.	II.	VII.	III.
Mean pressure at engine outlet (tenths).	55.1	56.4	101	152	206	507	445
Change in original illuminating power per cent	−1.0	+5.9	−6.0	−6.0	−2.6	−2.8	−2.5
Change in original calorific value uncorrected per cent.	+1.9	+3.1	+1.8	−0.5	+2.8	+4.0	+1.9
Change in original calorific value corrected per cent.	+4.1	+4.9	+3.0	+2.5	+4.2	+6.8	+4.8

The last line of the table represents the change in the net calorific value of the gas after reduction to standard conditions. It will be seen that in every instance the gas gained in heating power by passage through the main; but the differences did not vary regularly with the pressures. The fourth line shows the analogous differences before reduction, and it will be noticed that a loss of calorific power occurred in experiment No. V. Just before experiment V. was begun, the gasholder at Riet blew, and gas was therefore passed very rapidly into the holder at St. Gall which was supplying the town. It seems possible, therefore, that some of the constituents of the gas forwarded during the earlier experiments which had deposited in the main and would in the ordinary way have raised the calorific value of gas No. V., were partially carried forward by the rush of gas into the holder whose contents were not investigated, whence they travelled at once into the distributing system of the town.

In general, it may be said that the high pressure transmission of gas at different pressures, and under varying pressure, does not decrease the calorific value. Some of its constituents appear to condense and to be volatilized again afterwards. But whether this would in-

1. *Journal of Gas Lighting.*

volve loss of heating power when the gas was forwarded continuously at high speed for a long time, cannot yet be told. It would, however, seem that no really prejudicial effect is to be anticipated.

Thoria in Ceylon.

The *Gas World* notes that a further report on the mineral survey of Ceylon has been made by Prof. W. R. Dunstan, F.R.S., Director of the Imperial Institute. In previous reports the discovery in the island of minerals containing high percentages of thoria was announced, one sample containing as much as 72.4 per cent. of thoria. In the present report Prof. Dunstan says that the collection of thorianite in Ceylon has yielded already a handsome return since the value of this mineral was made known in 1904, though the subsequent fall in the price of thoria has led to a lessening of activity on the part of the collector and a natural desire to hold rather than to sell the material which has been collected, in the expectation of a rise in its market value. The monazite of Ceylon, he adds, is richer in thoria, and, therefore, correspondingly more valuable than the monazite obtained in other localities. One specimen from Pussedola, Dela, Sab., contained 14 per cent. of thoria. The most important feature, it is stated, is the discovery of thorianite in minute crystals in alluvial sandy beds, and, still more important, *in situ* in decomposed crystalline rocks. A sand from Niriellaganga containing thorianite and gold, which was analyzed at the Imperial Institute, contained 17.82 per cent. of thoria, 3.26 per cent. of ceria and associated oxides, and 2.23 per cent. of gold, and the report states that if monazite of this quality can be obtained in quantity it would be readily saleable as a source of thoria. Another sample from Weralupedola, Ratnapura, contained 13.44 per cent. of thoria, 6.41 per cent. of ceria and associated oxides, 15.34 per cent. of stannic oxide, and 8.1 ounces of gold per ton, and of this it is said that "thorianite, tinstone, monazite and gold are all present in this concentrate in quantities which would repay working, and the commercial value of a concentrate of this composition, calculated from the present values of these four constituents, and excluding the cost of separation, would be about £212 per ton." But it is not yet known at the Imperial Institute whether the crude gravel from which the concentrate was prepared occurs in large quantity, or what yield per cent. of concentrate is obtainable from it. Another sample from Walaweganga contained 31.66 per cent. of thoria, 2.87 per cent. of ceria and associated oxides, 10.61 per cent. of uranoso-uranic oxide, and 9.62 per cent. of gold, but there is no information as to the relation between the concentrate and the crude alluvian. Yet another sample, from Balangoda, was found to contain 70.7 per cent. of thoria.

SPECIAL ENGLISH CORRESPONDENCE.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, Oct. 10th, 1907.

More about Coalite.—The Site for the New Gasholder.—Municipal Extravagance.

Some attention has been directed during the past month to the affairs of the coalite syndicate, and that for two reasons. The annual meeting of shareholders has been held, and what is called the master patent belonging to the company has been published. There is nothing in either the statements made at the meeting by the chairman, or in the description of his invention as set forth by the patentee, to call for very serious attention, so far as the gas industry is concerned, and the stockholders in that frequently threatened investment may still continue to possess their souls in peace. We are accustomed to be told on the one hand that we have a valuable monopoly, and on the other that some new idea or other is likely either to extinguish our existence or to revolutionize our procedure. Yet we keep on the even tenor of our way, and it would be difficult to trace the existence of competition from the accounts and books of a properly managed gas company. Cheap oil and electricity may be seen in the district, yet the annual increase in the demand for gas is well maintained. It is not the fault of inventors and promoters of new processes that we are still alive. But the fact remains.

The presentment of affairs from the official representative of the board of directors reveals the fact that coalite factories are in process of construction near London and in the Midlands, but are not yet in proper operation, and that arrangements are in progress for the sale of the staple product. But it is evidently too soon to form any idea as to whether the public are sufficiently keen on the advantages claimed to be the special feature of the new fuel to be willing to pay a remunerative price for it, a price appreciably more than that of the cost of coal. The revenue derivable from the sale of liquid residuals, if any value can be attached to gas works experience, is not likely to be of much importance. And while gas is a good primary, it is a bad secondary product, because it is so bulky that the question of storage is of limited degree only, and the disposal of quantities of gas that do not run fairly in harmony with the demand on profitable terms is an awkward one. It would appear, therefore, that the bulk of the profit obtainable from the manufacture must come in by way of the price received for the coalite itself.

A perusal of the patent specification, No. 14,365, 1906, leaves a gas engineer who is fairly well acquainted with the literature pertaining to his specialty, in some doubt as to whether he is not reading an extract from one of the earlier writers on gas manufacture, rather than an account of a modern discovery. There is an old world kind of flavor, redolent of Winsor, Murdoch, Accum and Clegg, in the statement of such elementary principles as, "the duration of the process of distillation may readily be determined at the point when illuminating gas ceases to be given off, and when the evolution of non-luminous gas is shown by the color of the flame, which may be ascertained by means of a jet provided for the purpose," or "the coal must be so arranged as regards the source of heat that the whole mass of the coal being tested can be evenly and uniformly heated." "Good results may be obtained by the use of a D-shaped metal retort 16 inches high, 5 feet wide and 7 feet long, placed horizontally, into which the fuel is charged to a height not exceeding 6 inches." But the best results are claimed to be obtained with vertical retorts of not less than 6 inches cross section, or with closed cylinders 10 to 12 inches in diameter, which are to be filled with coal, and are fitted with apertures for the escape of gas. Towards the end of the process steam is admitted to insure the final temperature being slightly lowered, and to cleanse the fuel from sulphur, the charge is drawn immediately the evolution of gas ceases, the fuel may be quenched in the retort, or preferably drawn into a receptacle where it is no longer subject to heat, and after closure the fuel is quenched by admission of steam. It would appear that to carry out this process in entirety a test jet must be provided to each retort and carefully watched. This would be impracticable where a large number of retorts were in use, and in practice the working would settle down into the periodical charges that are usual in gas works, especially as the operations in connection with quenching the coke are of a more elaborate character than those appertaining to the ordinary process of gas making. The only addition to be made to the description already given is the use of cylinders which may be filled with coal and packed into a large retort, and of steam for quenching. The coalite can be used without further treatment, and when burned in an open grate is claimed to develop more heat, last longer in burning and to be practically smokeless. Retorts, or ovens as they were then called, were used to a considerable extent some 50 years ago or so, of a size approaching the D-retort above named, but I believe that they are entirely out of use now. It is interesting to remember that one of the advantages claimed on their behalf was a superior quality of coke. On the whole the gas industry may look with a friendly eye on the operations of the Coalite Company. If a demand for a practically smokeless fuel is created, a considerable part of it could be met by gas works coke as at present manufactured, or by slight modifications that could readily be introduced. At present prices it is questionable whether the coke department of our industry is not worthy more attention than it has received in the past. In any large gas works, a skilled salesman having some knowledge of the trade could probably do better for the company than they are able to do for themselves.

A gasholder is admittedly not a thing of beauty nor is it a desirable neighbor on other grounds than æsthetics. But at the same time it is as much a necessity as a tall factory with a chimney shaft, a mill with a lot of whirling machinery, and a certain manufacturing process evolving fumes of a not altogether agreeable character. If gas is to be sold at the lowest possible rate, the holder must be close to the center of the district of supply, and not in a desert over the next hill. The law is somewhat stringent in this respect, as any company desiring to erect an additional holder must obtain the consent of all owners and occupiers within a radius of 300 yards. In some parts of the continent, I believe, a naked holder is not tolerated and it must be inclosed in an ornamental building; but I have only seen one specimen of this sort in England, and it consisted of a high wall with battlements and turrets surrounding and concealing the whole works. Gas companies in want of additional storage sometimes find them-

selves in the awkward position of not being able to find a site that is free from objection, or that does not involve troublesome litigation; and therefore considerable interest attaches to a legal decision recently delivered in Scotland. The Elgin Town Council desired to erect an additional gasholder, and issued the statutory notice to all the parties within the prescribed area, over 500 in number. Some 12 or 13 objections were raised, mostly based on the ground that the proposed erection would be prejudicial to the value of property, that it would be an eyesore when viewed from the windows and that it would be a source of danger or of nuisance, and the Council applied for an order of Court to dispense with the consents in question. This they were successful in securing. The Sheriff held that the new gasholder was proved to be a public necessity, that the site proposed was the best sort of three that had been under consideration, and that after hearing evidence on both sides, the petitioners had made out a sufficient case for dispensing with the consents. As to the objections, the surroundings were not incongruous, the present gas works, the public shambles, the public refuse works and engineering department being within 100 yards of the proposed site. Apart from some temporary leakage there would be no appreciable odor, nor was there any danger from explosion. As to the claim that the appearance of the holder would be an eyesore, that would apply to almost any technical structure, and he did not think that any interference with outlook or scenery was an injury of a character constituting a reasonable objection to its erection. As regarded the efficient and economical management of the gas undertaking the proposed site appeared to be the best obtainable, but he suggested that if practicable the height should be lowered by sinking the bank some 15 feet or so below the level of the ground. This decision supports one delivered at Greenock in 1895, and is indeed the only commonsense view that can be taken of the case. People residing or holding property in manufacturing districts must be prepared to sacrifice their æsthetical ideas, to a reasonable extent, on the altar of utility, if their neighbors are to do a remunerative trade.

The risks attending municipal trading are evident in the small town of Monmouth, according to the facts elicited at a recent inquiry conducted by an Inspector of the Local Government Board. In 7 years the results of working an electric lighting undertaking were a loss of nearly £5,000, equivalent to a rate of 8¼d. in the £1 per annum. And with an assessable value just under £2,000 the existing outstanding loans are over £3,000, and the Council desire to borrow another £10,000. A local newspaper sums up the position in a very few words, which are deserving the serious consideration of all large ratepayers and all interested in municipal finance. After pointing out that in place of a profit of 7d. in the £1, which was anticipated when the works were started, there has been a loss of 8¼d. in the £1, the writer proceeds: "What folly prompted the Monmouth Corporation to embark upon this electric lighting scheme we cannot conceive; but its disastrous failure should act as a warning to all other small municipalities. Many a little town cherishes ideals of public ownership far too big for it. The ambition of the mayor and corporation of a small borough to rise out of the drab level of everyday existence and control big enterprises on behalf of the ratepayers is easy to understand. As in Monmouth, this ambition usually overleaps itself. It is satisfactory to notice the keen spirit with which Local Government Board Inspectors are inquiring into applications for municipal loans. This is an indication that the government are alive to the fact that the reckless extravagance of the municipalities is becoming a grave national danger. We hope they will find a way of putting an effective stop to it." Unfortunately, ambition of the overleaping kind is not a feature confined to the smaller corporations. In fact, the larger the corporation the easier for such practices to pass unnoticed, because there is a larger rateable value to fall back upon, and also if there are several departments, such as water, gas, tramways, etc., it is easy to make the profits from one department conceal the losses on another. The Monmouth Council have only done the same as many others, but they have a small rateable value and no profitable department from which large sums can be transferred for "the relief of the rates." These words, which are a sort of blessed Mesopotamia to the average ratepayer, in many cases cover troubles like those at Monmouth, and the expression "reckless extravagance" is not one whit too strong. The interest of gas undertakings in the matter is evident when it is remembered that they pay a large proportion, sometimes as much as one-third of their total profits, to the rate collectors, and yet have no voice or control in regard to the expenditure. They will, therefore, look with favor on any action by the Local Government Board in the direction of controlling or checking municipal extravagance.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

UNDER the new schedule put out by the San Diego (Cal.) Consolidated Gas and Electric Company, to become effective March 1, prox., the selling rates for electric current have been reduced on an average of 16.4 per cent.

THE concern known as B. S. Wathen and associates that was granted a tentative franchise some time ago to manufacture and sell gas in Dallas, Tex., has not completed its initial pledges. Prominent in this matter was the deposit of $2,500 as a guarantee that work would be begun within a given time. The time limit for the deposit was 30 days, which period was up to the 19th inst. Failure to put up the money within the time works a forfeiture of the grant.

THE subscription lists to the sum required to pay for the planned betterments on the plant of the Easthampton (Mass.) Gas Company have been closed. The payments on the named account are returnable the 15th November and the 15th May, next. When the betterments are completed the Company will to all intent and purpose own a new works.

WE are indebted to Mr. Frank T. Moran for this record from the books of the Denver Gas and Electric Company, respecting the action of its Board of Directors regarding the death of Mr. Robert Barry Sullivan, late member of the Board and at one time the Company's Treasurer:

"*Resolved*, That it is with deep regret and profound sorrow that the Directors of this Company heard the announcement of the death of Robert Barry Sullivan, a member of this Board and formerly Secretary and Treasurer of the Company.

"During the time Mr. Sullivan was associated with us in the active management of the Company's business, his sterling integrity, indefatigability, industry and exceptional ability, and his frank and open courtesy endeared him alike to our employees as well as to us, his associates. We voice alike the sentiments of the managers and employees when we say that the announcement of his untimely death was a terrible shock and his loss a personal one to us all.

"We recognize that time always has, and always will, remove from the stage of action the aged and infirm, but when His pruning knife cuts off in the flower of young manhood the branch budding with the promise of future usefulness, the loss sustained cannot be estimated, and the shock felt benumbs expression.

"We extend to his father, who has for many years been so intimately connected in the management of the Company's affairs, his mother and to the widow and family of our deceased brother, the heartfelt sympathy of the Board of Directors and employees."

THE President of the proposed Gas Company for St. Petersburg, Fla., is Mr. A. P. Avery.

WE are informed that the contract for the new works for the Citizens Gas Company, of Burlington, Wis., has been awarded to the Practical Gas Construction Company, of Chicago. Why, we do not know!

THE plant and properties of the Lawrence Gas Company, of New Castle, Pa., will be sold at auction on a day to be announced later.

THE General Gas Appliance Company, of Grand Rapids, Mich., has been organized by Messrs. Augustin Hendricks, O. A. Bell and Walker M. Hawley. It is capitalized in $15,000.

MR. JAS. W. ROBB, Manager of the Chattanooga (Tenn.) Gas Company, left that city the 11th inst. without informing anyone connected with the Company as to where he was going, or on what mission or as to his length of absence. Important business matters requiring his attention having developed, and not having been able to locate him, the usual measures to determine a person's whereabouts were put in motion, without result up to the 18th inst. His accounts are perfectly straight and up-to-date. It is feared that his nervous system—he was always moving at the highest tension—has suffered a complete collapse. [Since this item was prepared Mr. Robb was located in Jefferson City, Mo., wandering over its streets. His mind is, to say the least, in a very bad state, and his relatives have placed him in a sanitarium.]

PARKESBURG, PA., is to have a gas works, if the efforts of Messrs. Charles F. Cattell and W. J. Corcoran, of West Chester, Pa., are to be successful; and there can be no reasonable doubt about the fact that yes is the answer to the latter.

MR. ALTON D. ADAMS is still "experting" on the job at Woonsocket, R. I.

MR. H. S. WILLIAMS, Clerk of the U. S. Circuit Court, has been appointed special master to receive and carry the impounded funds to accrue from the withholding of 5 cents per 1,000 cubic feet from consumers by the Buffalo (N. Y.) Gas Company until the trial as to the legality of the order reducing the rate from $1 to 95 cents is determined.

A LARGE attendance of experts and laymen greeted Mr. George C. Osborne, Illuminating Engineer of the General Electric Company, during his recent lecture on lighting by electricity, delivered some evenings ago in the office of the Consolidated Gas, Electric Light and Power Company, of Baltimore, Md. The expressions of the lecturer were well brought out in a series of excellent stereopticon views.

THE following are the provisions of the proposed ordinance to govern the inspection of the quality of gas made and of the accuracy of meters used in its registration by the Cincinnati Company:

Sec. 1. That said city, through its department of Public Service, shall employ a chemist or gas expert, who shall be known as the Gas Inspector, and —— Assistant Inspectors.

Sec. 2. It shall be the duty of said Inspector and his assistants to test the pressure and heat unit quality of the gas furnished by said Company, its successors or assigns, as often as they deem necessary, and shall analyze the gas so furnished for added diluents or other impurities. The result of any and all such tests shall be reported to the Board of Public Service, or its successors in office or authority, and shall be entered upon a record kept by said Board for such purpose, which shall be open at all times to public inspection.

Sec. 3. Upon written application of any consumer of gas within the city, made to the Board of Public Service or to its successors in office or authority, and accompanied by a fee of $1 (being an inspection fee of 25 cents and the expense of removing said meter for the purpose of being tested), the Inspector of Gas shall inspect and determine the correctness of any gas meter designated in such application. The fee of $1 shall be paid into the City Treasury to the credit of the general fund. All meters shall be tested with a meter prover which has been tested and sealed by the State Sealer of Weights and Measures before being used. If the meter be found incorrect said fee of $1 shall be returned to said consumer, and the Company shall immediately repair said meter or furnish a new meter without charge to the consumer. If it be necessary for the examination of said meter to disconnect and remove the same, said Company shall immediately supply such consumer with another meter for use during the time required for such inspection.

Sec. 4. This ordinance shall take effect and be in force from and after the earliest period allowed by law.

THE Board of Directors of the Peoples Gas and Coke Company, of Los Angeles, Cal., having deposed Prof. T. S. C. Lowe from the office of that corporation, Mr. G. Hayes (formerly Vice-President of the Company) was chosen to succeed him. Mr. E. R. Taylor was elected to succeed Professor Lowe.

WE herewith acknowledge the courtesy of the H. Mueller Manufacturing Company in forwarding us a copy of its Souvenir Book. Meanwhile we may say that the book is not published for general circulation. It is a beauty.

MR. W. D. TURNER has resigned the position of the Secretaryship of the Bristol (Tenn.) Gas and Electric Company to accept a place on the force of the American Locomotive Works.

MR. C. W. BUTTERWORTH, now at St. Albans, Vt., will assume the duties of Superintendent of the Milton (Pa.) Gas Company on or about the 1st prox.

ACCORDING to a recent issue of the Scranton (Pa.) *Truth*, the American Gas and Electric Company, the holding Company of the Scranton Electric Company, which controls all the electric light and power companies in Scranton, Dunmore and the upper valley as far as Olyphant, after a long period of negotiations, is in a position to acquire control of the Standard Electric Light, Heat and Power Company, of Avoca, which supplies all the territory between the Scranton city line on the south and the city line at Pittston. The significance of the procuring lies in the fact that it is another step by the American Gas and Electric Company to secure control of all the lighting and power companies in the Lackawanna Valley and in the Wyoming Valley to Wilkes-Barre.

A CORRESPONDENT in Brooklyn, N. Y., forwards the following: "The streets of the borough of Queens, L. I., are certainly well lighted, and its old time twistings of avenues, streets and byways constitute a rather mean sort of maze to illuminate perhaps the word peculiar would be better than the word mean. However, the following lamps, number and cost of same are at present being maintained in the borough: 3,690 Welsbach mantle type, 60-candle power each, at $24.35 each; 717 mantle lamps, naphtha type, 60-candle, at $27.74; 60 incandescent electric lamps, at $25 each also, 14 lamps of this type are furnished free; 2,520 electric arc lamps, 1,200-candle power each, at $90 each – also, 25 of the latter, at no charge. The total cost per annum of these is $370,722.58, and the hours of burning on all are 4,000 for the year, each. Gas lamps of the mantle type are much preferred in residential streets to the arc lamps because, being situated much lower, the foliage of the trees does not interfere so greatly with them. An average of between three and four of the gas lamps can be placed in the area covered by one arc lamp and the result is much more satisfactory, of course."

THE improvements on the Montgomery (Ala.) plant, as per the estimate of Mr. R. J. Chambers, General Manager, will involve an expenditure of about $30,000. The main items in the new work are in the generating and purifying apparatus.

THE Union Gas and Electric Company, of Cincinnati, O., has arranged to extend its mains and wires to the settlements of Delhi, Clewes, Home City and North Bend.

MANAGER HARRISON states positively that the new gas plant for Bessemer, Ala., will be in working order for and will be actively engaged in the manufacture and distribution of gas in that city by January 10th. The main system at the start will cover 10 miles of streets.

AT the annual meeting of the Troy (N. Y.) Gas Company the Directors elected were: Robert C. Pruyn, Peter McCarthy, A. N. Brady, A. M. Ide, Bleecker Banks, Thomas Breslin, A. E. Bonesteel, Edward Murphy, F. J. Mallory, William Kemp, James W. Fleming, F. E. Draper and C. E. Davenport. Mr. Alba M. Ide succeeds his father, the late Mr. George P. Ide.

PECATONICA, ILLS., is said to be anxious to have a gas works "placed in its midst." The residents also declare that local capital can be counted on "to assist." Why don't the local capitalists do it all? The sum of $50,000 will be ample.

"L. T. M.," writing from Ann Arbor, Mich., under date of the 18th inst., forwards the following: "With much sorrow I report to you the death of Mr. Edward Gauss, for quite some time bookkeeper for the Ann Arbor Gas Company. Deceased, who was only 24 years old, having been born here September 19, 1883, was one of our most promising young business men, and his sprightliness and fine temper, added to ways that were good and wholesome, endeared him to all. He was a prominent member of Golden Rule Lodge, Washtenaw Chapter, and is survived by three brothers. Of these "Fred." is Professor of French, in Princeton College, and Carl and Robert are prominent in Ann Arbor's business circles. The cause of his death was hemorrhage of the lungs."

IN appreciation of the good work done by the Police Department of Revere, Mass., in running down prepayment meter thieves, Mr. A. B. Tenney, President of the Suburban Gas and Electric Company, recently forwarded his personal check for $50 to the Police Relief Fund Association of Revere.

WE are indebted to the courtesy of Mr. J. M. Hines, of Providence, R. I., for the following copy from the records of a special meeting of the Providence Gas Company's Directors, called to make proper recognition of the worth of the late Mr. William Goddard—the meeting was held the 16th inst.:

"At a meeting of the Directors of the Providence Gas Company, held this day, the following minute relating to the death of William Goddard, the Vice-President of the corporation, was ordered spread on the records, a copy sent to the family and published in the daily papers.

"William Goddard, Vice-President of this Company, died at his residence in this city on the 20th of September last.

"Mr. Goddard was elected a Director, June 12, 1850, 2 years after the organization of the Company, and was the survivor of his early associates.

"His interest in the success of the Company was early manifest and shortly he was charged with duty on its Executive Committee.

"Associating in these early days with the founders of the Company, he shared with them the no light burdens of organization and early service and through all the subsequent years to the end, with increasing interest in its growth and success, he gave freely of his time and talents. Our marked success to-day is due in large measure to his fostering care.

"His surviving associates would place on record their appreciation of his high character and of the valuable service he has rendered to the Company.

"We shall miss him from our councils, but pleasant memories of his gentleness, his unfailing courtesy and kindness will long survive."

THE Fitchburg (Mass.) Gas and Electric Company has issued notice that hereafter customers using prepayment meters are to be held responsible for moneys taken from the boxes by thieves. The order has aroused much unfavorable comment, and its legality will undoubtedly be tested through due process of law.

MR. E. L. MARCH has succeeded Mr. W. W. Hunt as Manager of the Alpena (Mich.) Gas Light and Fuel Company. The former has accepted an important place in the business relations of Mr. H. K. Gustin.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

PUBLISHED ON EACH MONDAY OF THE YEAR AT
No. 42 Pine Street, New York.
Telephone, 2996 John.

TERMS:

SUBSCRIPTION—Three Dollars per annum, in advance.
Single copies, 10 cents.

The JOURNAL is the official organ of the
NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, OCTOBER 28, 1907.

The Market for Gas Securities.

There is no market. Consolidated managed to get down to 79 this morning (Friday), but at noon the meridian figures were 80 to 80½. If these quotations are representative of values, then, as a famous phrasist once remarked, "there ain't no values." Perhaps at the moment silence in respect of the smash is golden, and as gold is very much in demand in these parts (Wall, Pine and Broad streets) here is for silence.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

OCTOBER 28.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	80	80¼
Central Union Gas Co.—				
1st 5's, due 1974, J. & J.	3,000,000	1,000	92	97
Equitable Gas Light Co.—				
Con. 5's, due 1931, M. & S.	1,000,000	1,000	..	105
Mutual	3,500,000	100	.	170
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	80	84
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p.ct.	1,000,000	..	98	104
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	90	98
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	100	105
Con. 5's, due 1945, J. & J.	1,500,000	..	97	101
Standard	5,000,000	100	70	100
Preferred	5,000,000	100	100	125
1st Mtg. 5's, due 1930, M. & N	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	82	100
1st Con. 5's, due 1948, M. & N	15,000,000	..	..	102
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Bay State	50,000,000	50	¼	⅜
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	..	65
" 1st Mtg. 5's	509,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
" " Bonds, 5's	5,250,000	1,000	63	66
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	106¾
Cincinnati Gas and Electric Co.	29,500,000	100	93	93½
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	92	96
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	87	88
Preferred	3,026,500	100	107½	109
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	..	90
Mortgage, 6's	3,500,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	..	..	100
Detroit City Gas Co.	5,000,000	50	..	50
" Prior Lien 5's	4,618,000	1,000	..	98
Detroit Gas Co., 5's	321,000	1,000	75	80
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	19	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	..	100	105
Bonds, 5's	10,500,000	..	101	102½
Indianapolis	2,000,000	..	60	70
" Bonds, 5's	2,650,000	..	104½	105
Jackson Gas Co.	250,000	50	82	..
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	86
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	..	105
Preferred	2,500,000	100	95	110
Bonds	10,000,000	1,000	104	104¼
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas & Elec. Co.				
" 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	60	60¼
Massachusetts Gas Companies of Boston	25,000,000	100	43¾	44
Preferred	25,000,000	100	77½	78
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co.	1,000,000	100	110	.
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	5,000,000	..	137	138
New Haven	2,000,000	25	200	..
Peoples G. Lt. & Coke Co., Chicago	25,000,000	100	74	74¼
1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	..
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	104½	105¼
San Francisco, Cal.	15,800,000	00	..	..
St. Joseph Gas Co. 1st Mtg. 5's	751,000	1,000	92	..
St. Paul Gas Light Co	1,500,000	100	45	47
1st Mortgage 6's	850,000	1,000	118	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	96¼	..
Syracuse, N. Y.	1,975,000	100	50	55
Bonds	2,047 000	1,000	102	..
Washington, D. C	2,500,000	20	396	400
1st Mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	..	..	..
Wilmington, Del.	600,000	50	220	..

Advertisers' Index.

GAS ENGINEERS. Page

A. E. Boardman, New York City ... 773
Baxter & Young, Detroit, Mich ... 783
B. E. Chollar, St. Louis, Mo ... 776
Cruse-Kemper Co., Philadelphia, Pa ... 772
Davis & Farnum Mfg. Co., Waltham, Mass ... 784
Economical Gas Apparatus Construc'n Co., Toronto, Ont ... 783
Frank D. Moses, Trenton, N. J ... 786
Frederic Egner, Norfolk, Va ... 788
H. M. Byllesby & Co., Chicago, Ills ... 784
Humphreys & Glasgow, New York City ... 784
Isbell-Porter Co., Newark, N. J ... 772
Kerr Murray Mfg. Co., Fort Wayne, Ind ... 785
The Gas Machinery Co., Cleveland, O ... 764
The Jeffrey Manufacturing Co., Columbus, O ... 782
United Gas Improvement Co., Philadelphia, Pa ... 779
Western Gas Construction Co., Fort Wayne, Ind ... 792

GAS WORKS APPARATUS AND CONSTRUCTION.

A. E. Boardman, New York City ... 773
Bartlett, Hayward & Co., Baltimore, Md ... 785
Baxter & Young, Detroit, Mich ... 783
Connelly Iron Sponge & Governor Co., New York City ... 781
Continental Iron Works, Brooklyn, N. Y ... 786
Cruse-Kemper Co., Philadelphia, Pa ... 772
Davis & Farnum Mfg. Co., Waltham, Mass ... 784
Deily & Fowler, Philadelphia, Pa ... 788
Economical Gas Apparatus Construc'n Co., Toronto, Ont ... 783
Frank D. Moses, Trenton, N. J ... 786
Humphreys & Glasgow, New York City ... 784
Isbell-Porter Company, New York City ... 772
Kerr Murray Mfg. Co., Fort Wayne, Ind ... 785
Lloyd Construction Co., Detroit, Mich ... 774
Logan Iron Works, Brooklyn, N. Y ... 788
Quintard Iron Works, New York City ... 784
R. D. Wood & Co., Philadelphia, Pa ... 786
Riter-Conley Mfg. Co. Pittsburgh, Pa ... 787
Stacey Mfg. Co., Cincinnati, O ... 787
The Gas Machinery Co., Cleveland, O ... 768
The Jeffrey Manufacturing Co., Columbus, O ... 782
United Gas Improvement Co., Philadelphia, Pa ... 779
Western Gas Construction Co., Fort Wayne, Ind ... 792

PROCESSES.

Bartlett, Hayward & Co., Baltimore Md ... 785
B. E. Chollar, St. Louis, Mo ... 776
Economical Gas Apparatus Construc'n Co, Toronto, Ont ... 783
Humphreys & Glasgow, New York City ... 784
Semet-Solvay Co., Syracuse, N. Y ... 774
The Gas Machinery Co., Cleveland, O ... 768
United Gas Improvement Co., Philadelphia, Pa ... 779
Western Gas Construction Co., Fort Wayne, Ind ... 792

SCRUBBERS AND CONDENSERS.

Continental Iron Works, Brooklyn, N. Y ... 786
Cruse-Kemper Co., Philadelphia, Pa ... 772
Davis & Farnum Mfg. Co., Waltham, Mass ... 784
Economical Gas Apparatus Construc. Co., Toronto, Ont ... 783
Isbell-Porter Co., Newark, N. J ... 772
Kerr Murray Mfg. Co., Fort Wayne, Ind ... 785
Logan Iron Works, Brooklyn, N. Y ... 788
R. D. Wood & Co., Philadelphia, Pa ... 786
Riter-Conley Mfg. Co., Pittsburgh, Pa ... 787
Stacey Mfg. Co., Cincinnati, O ... 787
The Gas Machinery Co., Cleveland, O ... 768
Western Gas Construction Co., Fort Wayne, Ind ... 792

PRODUCER POWER PLANTS.

Economical Gas Apparatus Construc. Co., Toronto, Ont ... 783
R. D. Wood & Co., Philadelphia, Pa ... 786

TAR AND CARBONIC ACID EXTRACTOR.

Economical Gas Apparatus Construc'n Co., Toronto, Ont ... 783
Isbell-Porter Co., Newark, N. J ... 772
Kerr Murray Mfg. Co., Fort Wayne, Ind ... 785
Stacey Mfg. Co., Cincinnati, O ... 787
The Gas Machinery Co., Cleveland, O ... 768
Western Gas Construction Co., Fort Wayne, Ind ... 792

AMMONIA CONCENTRATORS.

Michigan Ammonia Works, Detroit, Mich ... 786
The Gas Machinery Co., Cleveland, O ... 768
Western Gas Construction Co., Fort Wayne, Ind ... 792

GAS METERS.

American Meter Co., New York and Philadelphia ... 791
Detroit Meter Company, Detroit, Mich ... 791
D. McDonald & Co., Albany, N. Y ... 789
Helme & McIlhenny, Philadelphia, Pa ... 791
John J. Griffin & Co., Philadelphia, Pa ... 748
Keystone Meter Co., Royersford, Pa ... 790
Maryland Meter and Mfg. Co., Baltimore, Md ... 790
Metric Metal Co., Erie, Pa ... 791
Nathaniel Tufts Meter Co., Boston, Mass ... 790
New York Improved Meter Co., New York City ... 790
Pittsburg Meter Co., East Pittsburg, Pa ... 789
Rotary Meter Co., New York City ... 787
United States Meter Co., Brooklyn, N. Y ... 771

PREPAYMENT METERS.

American Meter Co., New York and Philadelphia..... 791
D. McDonald & Co., Albany, N. Y..... 789
Helme & McIlhenny, Philadelphia, Pa..... 791
John J. Griffin & Co., Philadelphia, Pa..... 748
Keystone Meter Co., Royersford, Pa..... 790
Nathaniel Tufts Meter Co., Boston, Mass..... 790
New York Improved Meter Co., New York City..... 790
Pittsburg Meter Co., East Pittsburg, Pa..... 789

PREPAYMENT METER ATTACHMENTS.

New York Improved Meter Co., New York City..... 790

WATER METERS.

Pittsburg Meter Co., East Pittsburg, Pa..... 789

GAS AND WATER PIPES.

Davis & Farnum Mfg. Co., Waltham, Mass..... 784
Donaldson Iron Co., Emaus, Pa..... 776
Economical Gas Apparatus Construc'n Co., Toronto, Ont. 788
R. D. Wood & Co., Philadelphia, Pa..... 786
Warren Foundry and Machine Co., New York City..... 776

GAS COALS.

Berwind-White Coal Mining Co., New York and Phila.. 782
Perkins Co., New York City..... 782
Westmoreland Gas Coal Co., Philadelphia, Pa..... 783

SPECIALTIES FOR OIL AND PIPE LINES.

S. R. Dresser, Bradford, Pa..... 770

GAS MAIN STOPPERS.

Safety Gas Main Stopper Co., New York City..... 776

MAIN AND SERVICE LAYING.

Sullivan Bros., Flushing, N. Y..... 786

GAS TAPPING MACHINES.

George Light, Dayton, O..... 776
H. Mueller Manufacturing Co., Decatur, Ills..... 775

CANNEL COALS.

Perkins & Co., New York City..... 782

STOKING MACHINERY.

G. A. Bronder, New York City..... 781

CONVEYORS.

Cruse-Kemper Co., Philadelphia, Pa..... 772
C. W. Hunt Company, New York City..... 773
Economical Gas Apparatus Construc'n Co., Toronto, Ont 788
G. A. Bronder, New York City..... 781
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 785
The Gas Machinery Co., Cleveland, O..... 768
The Jeffrey Manufacturing Co., Columbus, O..... 782
Western Gas Construction Co., Fort Wayne, Ind..... 792

CHARGING BARROWS & COAL WAGONS.

Davis & Farnum Mfg. Co., Waltham, Mass..... 784
Kerr Murray Mfg Co., Fort Wayne, Ind..... 785
Stacey Mfg. Co., Cincinnati, O..... 787

GAS ENRICHERS.

Standard Oil Co., New York City..... 783

COKE CRUSHERS.

C. M. Keller, Columbus, Ind..... 783
The Jeffrey Manufacturing Co., Columbus, O..... 782

GAS METER CONNECTIONS.

H. Mueller Manufacturing Co., Decatur, Ills..... 775

GAS COCKS.

H. Mueller Manufacturing Co., Decatur, Ills..... 775

GAS GAUGES.

The Bristol Co., Waterbury, Conn..... 773

GAS GOVERNORS.

Chaplin-Fulton Mfg. Co., Pittsburgh, Pa..... 776
Connelly Iron Sponge & Governor Co., New York City. 781
Isbell-Porter Co., Newark, N. J..... 772
Pittsburg Meter Co., East Pittsburg, Pa..... 789
R. D. Wood & Co., Philadelphia, Pa..... 786
Reynolds Gas Regulator Co., Anderson, Ind..... 773

FUEL ECONOMIZERS.

Green Fuel Economizer Co., Matteawan, N. Y..... 773

(Continued on page 766.)

Estimates furnished for the erection of complete gas works or the extension and modernizing of old works. All work warranted. Both water gas and coal gas.

EMPIRE GAS IMPROVEMENT & CONSTRUCTION COMPANY,
1628-tf 49 Wall Street, New York.

Position Wanted.

I want a position as superintendent or assistant superintendent of a gas company or a combined gas and electric company. Am a good mechanical engineer and thoroughly understand construction work, operation and the development of new business. Have had 12 years' special training in keeping down expenses and investment. Am now employed, but will make change December 1st, 1907.

Address, "H. M. E.,"
1690-2 Care this Journal.

Position Wanted.

A successful gas and electric manager and engineer is open for a position in a city of not less than 25,000. All correspondence confidential. Can furnish best of references.

1689-4 Address, "PRACTICAL," care this Journal.

Position Wanted.

An American man of 40 wants position with coal gas company anywhere in the United States or Canada; South or West preferred. Has had 20 years' experience and knows every detail of the business. Is employed at the present time with one of the largest companies in New England.
Address, "A. M. G.,"
1690-1 Care this Journal.

WANTED,

Position as Superintendent or Manager of a Gas Works.

Have had experience in all branches, from complaint man to manager. Can handle men successfully and get the work done cheaply. Best of references furnished. Will go anywhere. Moderate salary.

1690-1 Address, "W. R. A.," care this Journal

WANTED, FOR WESTERN TERRITORY,

A Traveling Salesman for a Leading Line of Gas Stoves and Ranges already Established.

Must be thoroughly competent, of extended experience and good, established connections among gas companies. A permanent and good paying position to the right man. Address, giving age, experience and references,
"C. S. M.,"
1659-tf Care this Journal.

WANTED.

COMPETENT MAN AS GENERAL MANAGER

For small coal gas plant.

Address, ... "J. 3,"
1690-tf Care this Journal.

MANAGER WANTED

For a gas company in a rapidly growing town with 75,000 population, in New York State. In replying, state age, experience, and salary expected. Address, "BOX 142,"
1688-3 Care this Journal.

WANTED,

Four Second-Hand Purifiers,

Size, 10 by 10 or 10 by 12. Address, stating price, "F. R. A.,"
1690-tf Care this Journal.

WANTED,

1,000 Second-Hand Humphrey or Welsbach Gas Are Lamps.

State condition and price.
Address, "H. H. H.,"
1690-1 Care this Journal.

FOR SALE,

One 48-Inch Station Meter Complete.

It has not been connected since rebuilt 9 months ago by Helme & McIlhenny, Philadelphia, Pa. We refer you to them.

STANDARD GAS AND ELECTRIC CO.,
1686-tf RALEIGH, N. C.

300 PREPAYMENT METERS FOR SALE.

Will adapt them to any rate needed by purchaser. Nearly new and in first-class condition. Also, 100 ordinary, 3-light meters. Address, "BOX 144,"
1688-6 Care this Journal.

FOR SALE.

SECOND-HAND APPARATUS.

Owing to enlargement of plant, the undersigned have available for disposal the undermentioned equipment:

Two Roots' Blowers, direct connected to 35-horse power vertical engines on same bedplate; 20-inch connections.

Two Laidlaw (Glasgow) Vertical Gas Exhausters, direct connected to 20 horse power vertical engines on same bedplate; 14 inch connections.

One Dempster (Manchester) High Speed Rotary Gas Exhauster, direct connected to 30 horse power horizontal engine on same bedplate; 14-inch connections.

MONTREAL LIGHT, HEAT & POWER CO.,
1690-4 Montreal, Canada.

STANDARD REDUCTION FACTORS for GASES,
By Helon Brooks MacFarland, B.S., M.M.E.
Price, $1.50. *For Sale by*
A. M. Callender & Co., 42 Pine St., New York City.

GAS PROPERTIES FOR SALE.

TWO MODERN PLANTS SERVING THREE TOWNS OF 35,000 POPULATION AND LOCATED IN THE EASTERN STATES.

FOR PARTICULARS, ADDRESS

"OWNERS,"

Care this Journal.

GAS AND ELECTRIC PROPERTIES BOUGHT AND SOLD.

M. J. LOXLEY COMPANY,
Land Title Building, Philadelphia, Pa.

(*Concluded from page 765.*)

CEMENTS.

C. L. Gerould, Pittsburgh, Pa..... 786

RETORTS AND FIREBRICKS.

Baltimore Retort and Firebrick Co., Baltimore, Md. .. 780
Gas Bench Construction Co., St. Louis, Mo. 780
Henry Maurer & Son New York City..... 773
James Gardner Jr., Co., Bolivar, Pa..... 782
J. H. Gautier & Co., Jersey City, N. J..... 780
Laclede-Christy Clay Products Co., St. Louis, Mo.. ... 769
Missouri Firebrick Co., St. Louis, Mo..... 782
Parker-Russell Mining and Mfg. Co., St. Louis, Mo... 771

INCLINED RETORTS.

Baltimore Retort and Firebrick Co., Baltimore, Md..... 782
Gas Bench Construction Co., St. Louis, Mo..... 782
Laclede-Christy Clay Products Co., St. Louis, Mo. 769
Parker-Russell Mining and Mfg. Co., St. Louis, Mo..... 771

VERTICAL S'S.

Connelly Iron Sponge & Gov. Co. (Drake's [Eng.] System) 781
Gas Bench Construction Co., St. Louis, Mo..... 782
Laclede-Christy Clay Products Co., St. Louis, Mo. 769
Parker-Russell Mining and Mfg. Co., St. Louis, Mo..... 771

REGENERATIVE FURNACES.

Baltimore Retort and Firebrick Co., Baltimore, Md..... 782
Bartlett, Hayward & Co., Baltimore, Md... 785
Gas Bench Construction Co., St. Louis, Mo..... 782
J. H. Gautier & Co., Jersey City, N. J. 782
Laclede-Christy Clay Products Co., St. Louis, Mo 771
Missouri Firebrick Co., St. Louis, Mo..... 782
Parker-Russell Mining and Mfg. Co., St. Louis, Mo..... 771

SELF-SEALING MOUTHPIECE DOORS.

Continental Iron Works, Brooklyn, N. Y..... 786
Davis & Farnum Mfg Co., Waltham, Mass..... 784
Isbell-Porter Co., Newark, N. J..... 772
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 785
Logan Iron Works, Brooklyn, N. Y..... 788
R. D. Wood & Co., Philadelphia, Pa..... 786
Stacey Mfg. Co., Cincinnati, O..... 787
The Gas Machinery Co., Cleveland, O..... 748
Western Gas Construction Co., Fort Wayne, Ind..... 792

INCANDESCENT GAS LAMPS.

General Gas Light Co., Kalamazoo, Mich..... 775
Geo. G. Ramsdell, New York City..... 772
Welsbach Company, Gloucester, N. J..... 778

BURNERS.

Wm. M. Crane Co., New York City..... 770

STREET LAMPS.

Thos. T. W. Miner, New York City..... 776
Welsbach Street Lighting Co., New York and Phila... 778

PURIFIERS.

Connelly Iron Sponge & Governor Co., New York City.. 781
Cruse-Kemper Co., Philadelphia Pa..... 772
Davis & Farnum Mfg. Co., Waltham, Mass..... 784
Isbell-Porter Co., Newark, N. J..... 772
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 785
R. D. Wood & Co., Philadelphia, Pa..... 786
Stacey Mfg. Co., Cincinnati, O.. 787
Western Gas Construction Co., Fort Wayne, Ind..... 792

PURIFYING MATERIALS.

Connelly Iron Sponge & Governor Co., New York City.. 781

VALVES.

Continental Iron Works, Brooklyn, N. Y.. 786
Davis & Farnum Mfg. Co., Waltham, Mass..... 784
Economical Gas Apparatus Construc'n Co, Toronto, Ont 783
Isbell Porter Co., Newark, N. J..... 772
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 785
Ludlow Valve Manufacturing Co., Troy, N. Y..... 773
R. D. Wood & Co., Philadelphia, Pa..... 786
Stacey Mfg. Co., Cincinnati, O..... 787
The P. H. & F. M. Roots Co., Connersville, Ind..... 775
Western Gas Construction Co., Fort Wayne, Ind..... 792

EXHAUSTERS.

Connelly Iron Sponge & Governor Co., New York City.. 781
Davis & Farnum Mfg. Co., Waltham, Mass..... 784
Isbell-Porter Company, Newark, N. J..... 772
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 785
The P. H. & F. M. Roots Co., Connersville, Ind..... 775

PURIFIER AND SCRUBBER TRAYS.

Cabot Mfg. Co., Hoboken, N. J..... 788
Western Gas Construction Co., Fort Wayne, Ind..... 792

GAS STOVES.

American Meter Co., New York and Philadelphia..... 791
Keystone Meter Co., Royersford, Pa 790
Maryland Meter & Manufacturing Co., Baltimore, Md.. 790
Nathaniel Tufts Meter Co., Boston, Mass..... 790
Stamford Gas Stove Co., Stamford, Conn..... 781

HOT WATER HEATERS.

Humphrey Co., Kalamazoo, Mich..... 775

GASHOLDER TANKS.

J. P. Whittier, Brooklyn, N. Y..... 786

GASHOLDERS.

Bartlett, Hayward & Co., Baltimore, Md..... 785
Continental Iron Works, Brooklyn, N. Y..... 786
Cruse-Kemper Co., Philadelphia, Pa. 772
Davis & Farnum Mfg. Co., Waltham, Mass..... 784
Deily & Fowler, Philadelphia, Pa 788
Economical Gas Apparatus Construc'n Co., Toronto, Ont 783
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 785
Logan Iron Works, Brooklyn, N. Y..... 788
R. D. Wood & Co., Philadelphia, Pa..... 786
Riter-Conley Mfg Co., Pittsburgh, Pa..... 787
Stacey Mfg. Co., Cincinnati, O..... 787
Western Gas Construction Co., Fort Wayne, Ind..... 792

STORAGE TANKS.

Davis & Farnum Mfg. Co., Waltham, Mass..... 784
Stacey Mfg. Co., Cincinnati, O..... 787
Western Gas Construction Co., Fort Wayne, Ind..... 792

PATENTS, TRADE-MARKS, COPYRIGHTS.

Royal E. Burnham, Washington, D. C..... 783

Utilize Your Gas Liquor.

NO EXTRA LABOR OR OPERATING EXPENSES.

IMPROVED AMMONIA CONCENTRATOR.

About 100 in use. Write to

STROH & OSIUS, Patentees, or

MICHIGAN AMMONIA WORKS, • Detroit, Mich.

SCIENTIFIC BOOKS.

CHEMISTRY OF GAS MANUFACTURE. By W. J. A. Butterfield. Vol. I., Material and Processes. $2.50. Vol. II., In Preparation.

MODERN APPLIANCES IN GAS MANUFACTURE. By Fletcher W. Stevenson. $2.

MODERN GAS ENGINES AND PRODUCER GAS PLANTS. By R. E. Mathot. $2.50.

COAL TAR AND AMMONIA. By George Lunge. $15.

ELECTRIC GAS LIGHTING. By H. S. Norrie. 50 cents.

GAS ANALYST'S MANUAL. By J. Abady. $6.50.

GAS ENGINE DESIGN. By Charles Edward Lucke, Ph.D. $3.

THE "GAS WORLD" YEAR BOOK, 1906. Edited by John Douglas. $3.

GAS AND GAS WORKS. By Hughes and O'Connor. $2.50

POOLE ON FUELS. By Herman Poole. $3.

GAS ENGINEER'S POCKET-BOOK. By Henry O'Connor $3.50.

GAS CONSUMER'S HANDYBOOK. By Wm. Richards. 20 cents.

PRACTICAL TREATISE ON HEAT. By Thomas Box. 2d edition. $5.

PRACTICAL PHOTOMETRY: A Guide to the Study of the Measurement of Light. By W. J. Dibdin. $3.

CHEMICAL TECHNOLOGY: Vol. I., *Fuel and Its Applications*, $5. Vol. II., *Lighting*, $4.

IRONWORK: Practical Designing of Structural Ironwork. By H. Adams. $3.50.

SELF-INSTRUCTION FOR STUDENTS IN GAS MANUFACTURE. Elementary, advanced and constructional, each, $1.50.

LIQUID FUEL FOR MECHANICAL AND INDUSTRIAL PURPOSES. By E. A. Brayley Hodgetts. $2.50.

COX'S GAS FLOW COMPUTER. High pressure, $5. Low pressure, $2.50.

TECHNICAL GAS ANALYSIS. By Winkler & Lunge. $4.

HEMPEL'S GAS ANALYSIS. $2.25.

HANDBOOK FOR GAS ENGINEERS AND MANAGERS. Seventh edition. By Thomas Newbigging. $6.50.

GAS, GASOLINE AND OIL ENGINES. By Gardner D. Hiscox. Fifteenth edition. $2.50.

PRACTICAL HANDBOOK ON GAS ENGINES. By G. Lieckfeld. $1.

HEAT A MODE OF MOTION. By John Tyndall. $2.50.

THEORY OF HEAT. By J. Clerk-Maxwell. $1.50.

AMMONIA AND AMMONIUM COMPOUNDS. By Dr. R. Arnold. $2.

GASFITTERS' QUESTION BOOK, WITH ANSWERS. By Albert Dunbar, S.B. $1.60.

A TREATISE ON THE COMPARATIVE COMMERCIAL VALUES OF GAS COALS AND CANNELS. By D. A. Graham. $3.

A TEXT BOOK OF INORGANIC CHEMISTRY. By Prof. Victor Von Richter. $2.

ILLUMINATING AND HEATING GAS. By W. Burns. $1.50

HANDBOOK FOR MECHANICAL ENGINEERS. By H. Adams. $2.50.

FINANCES OF GAS, ELECTRIC LIGHT AND POWER ENTERPRISES. By Wm. D. Marks. $4.

EXCERPTS FROM DECISIONS, MASSACHUSETTS GAS COMMISSIONERS. By E. H. Yorke. $1.

STANDARD REDUCTION FACTORS FOR GASES. By Helon Brooks MacFarland. $1.50.

PRACTICAL PLUMBING. By P. J. Davies. Vol. I., $3. Vol. II., $4.50.

AMERICAN SANITARY PLUMBING. By James J. Lawler. $2.

TREATISE ON MASONRY CONSTRUCTION. Baker. $5.

FIELD'S ANALYSIS, 1906. $5.

AMERICAN GAS ENGINEERING PRACTICE. By M. Nisbet Latta. $4.50.

A COMPARISON BETWEEN THE ENGLISH AND FRENCH METHODS OF ASCERTAINING THE ILLUMINATING POWER OF COAL GAS $1.60.

JONES JET PHOTOMETER, for Coal or Water Gas. Each $10.

ELECTRICITY.

ELECTRIC WIRING DIAGRAMS AND SWITCHBOARDS. By Newton Harrison, E.E. $1.50.

CARE AND MANAGEMENT OF ELECTRIC POWER PLANTS. By Norman H. Schneider. Cloth, $1.50. Leather, $2.50.

INDUSTRIAL PHOTOMETRY, with Special Application of Electric Lighting. By A. Palaz, Sc.D. $4.

ELEMENTS OF ELECTRIC LIGHTING, Including Electric Generation, Measurement, Storage and Distribution. By Philip Atkinson. $1.50.

ELECTRIC TRANSMISSION OF ENERGY. By G. Kapp. $3.50.

ELECTRICIAN'S POCKET-BOOK. By Monroe and Jamieson. $2.50.

DYNAMO BUILDING. By F. W. Walker. 50 cents.

DOMESTIC ELECTRICITY FOR AMATEURS. By E. Hospitalier. $2.50.

PRACTICAL MANAGEMENT OF DYNAMOS AND MOTORS. $1.

PRACTICAL GUIDE TO THE TESTING OF INSULATED WIRES AND CABLES. $1.

ELECTRIC LIGHTING, by Francis B. Crocker. $3.

ELECTRIC LIGHT FITTING. $2.

PRACTICAL ELECTRICITY. $2.50.

ELECTRICITY FOR ENGINEERS. $2.50.

ELECTRICITY, Its Theory, Sources and Applications. By John T. Sprague. $6.

The above will be forwarded upon receipt of price. If sent by mail or express, postage or express charges must be added to above prices. We take especial pains in securing and forwarding any other Works that may be desired, upon receipt of order. All remittances should be made by check, draft, or post office money order. No books sent C.O.D.

A. M. CALLENDER & CO., - - - - - 42 Pine Street, New York City.

OFFICERS:

E. C. BROWN, President. B. H. SPANGENBERG, Gen'l Mgr. and Eng'r.

L. J. MONTGOMERY, Sec'y and Treas. SIDNEY A. REEVE, M.E., Consulting Eng'r.

DIRECTORS:

E. C. BROWN. IRA C. COPLEY, HENRY L. DOHERTY, GEO. D. ROPER, THOMAS G. MARSH, M.E., Dr. F. SCHNIEWIND, FREDERICK H. SHELTON.

EUROPEAN CONNECTIONS:

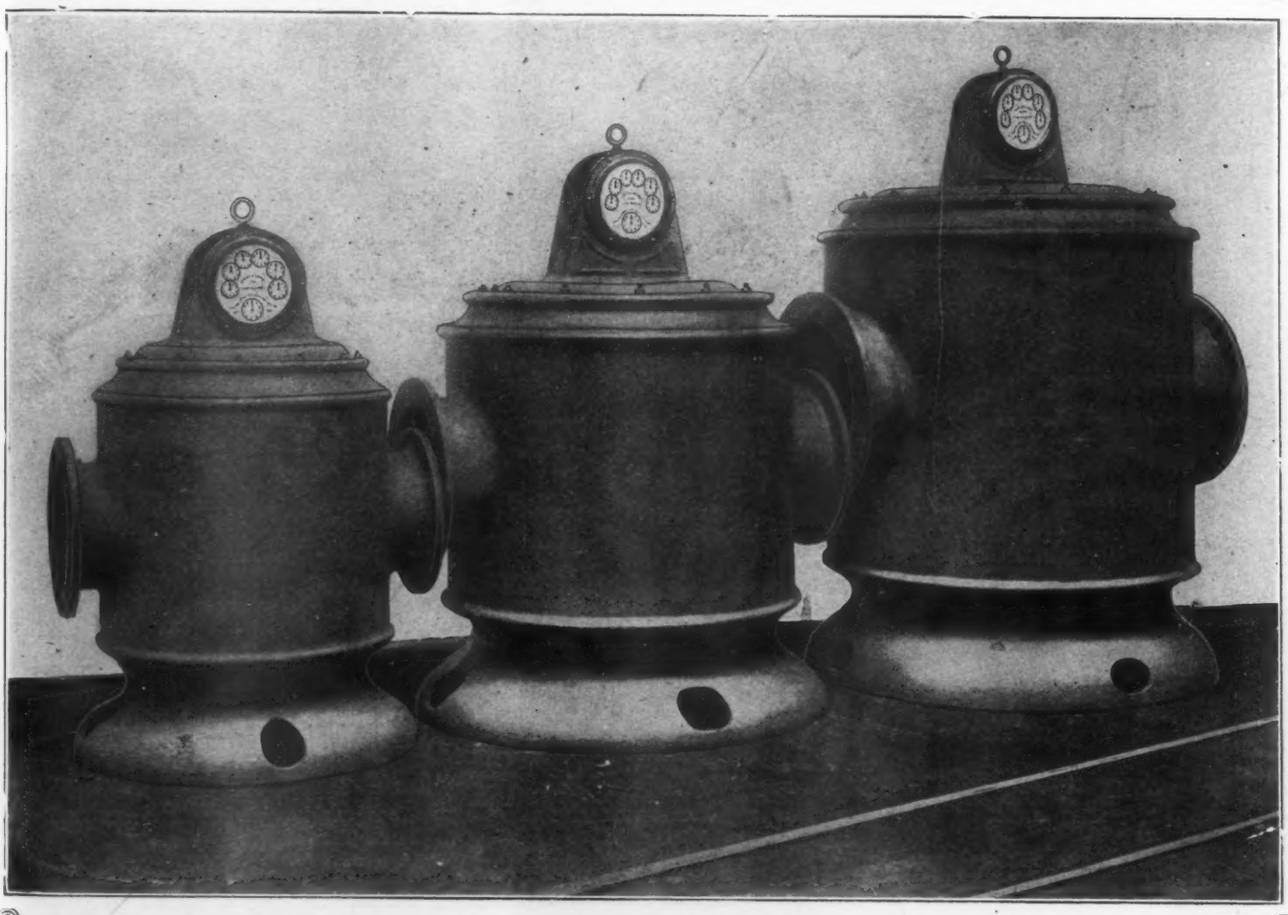
The Rotary Meter Co. (1905) Ltd., Manchester, England.
Compagnie pour la Fabrication des Compteurs et Materiel d'Usines a Gaz, Paris, France.

ROTARY STATION METERS

Now in use in the United States and Europe

MEASURING A DAILY MAKE OF MORE THAN 300,000,000 CUBIC FEET.

400 Installations to date with capacities from 500,000 Cubic Feet per Hour down to 5,000 Cubic Feet per Hour.



30,000 cu. ft. per hour.	45,000 cu. ft. per hour.	60,000 cu. ft. per hour.
12-inch connections.	16-inch connections.	20-inch connections.
40-inch face to face flanges.	52-inch face to face flanges.	58-inch face to face flanges.
50 inches floor to c. of dial.	61 inches floor to c. of dial.	70 inches floor to c. of dial.
FOR NORWICH, N. Y.	FOR EL PASO, TEXAS.	FOR CHESTER, PA.

The above engraving was reproduced from a photograph taken recently when these three meters were on the floor of our factory ready for shipment. Upwards of 50 Rotary Station Meters have at this date been installed or contracted for by gas companies located in 17 States of this country, and several in Canada.

ROTARY METER COMPANY TRADE MARK

One-half the cost—One-tenth the space of old style wet meters.

When in need of Station Meters, write

ROTARY METER COMPANY,

280 Broadway, NEW YORK.

Send for Catalog.

P. PLANTINGA, President W. E. STEINWEDELL, Secretary

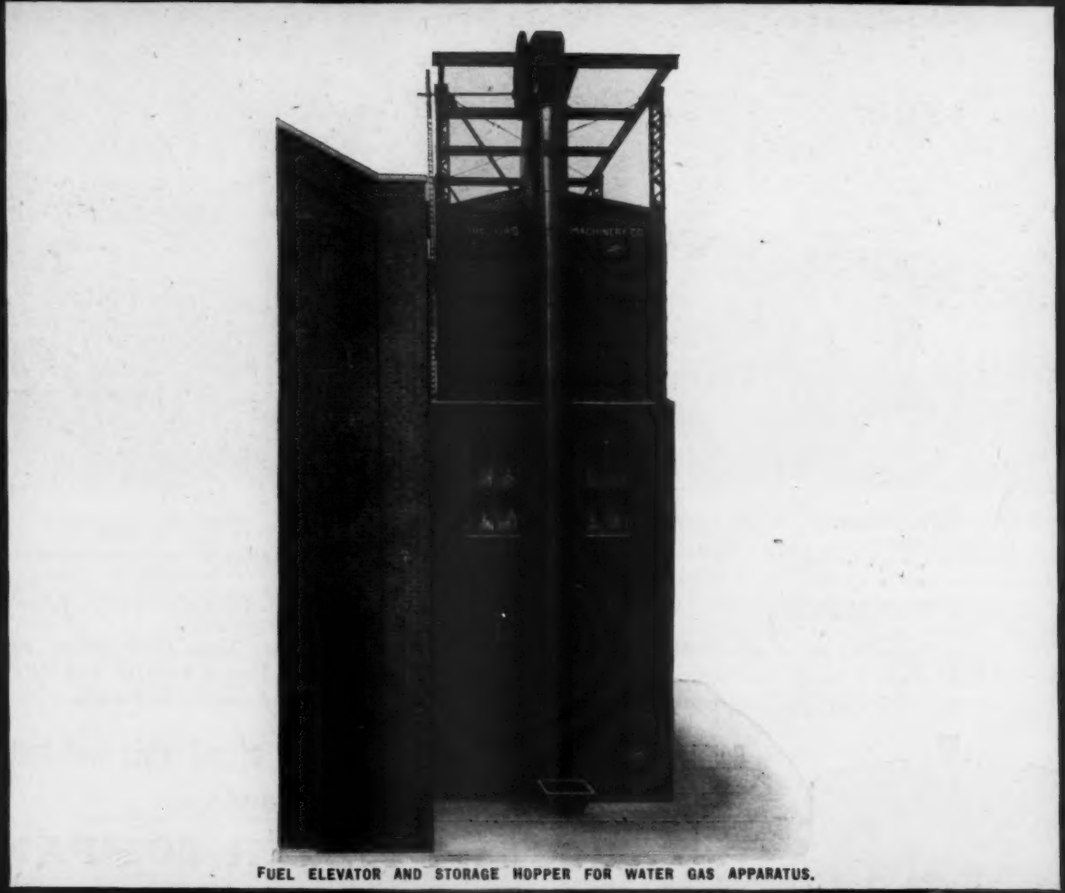
THE GAS MACHINERY CO.,

Main Office and Shops

CLEVELAND, OHIO.

NEW YORK OFFICE, - - - 56 PINE STREET.

COAL AND WATER GAS APPARATUS,
EXHAUSTERS, CONDENSERS, SCRUBBERS,
TAR EXTRACTORS, WASHERS, PURIFIERS,
VALVES, CONNECTIONS,
BY PRODUCT MACHINERY,
COMPLETE GAS PLANTS.



FUEL ELEVATOR AND STORAGE HOPPER FOR WATER GAS APPARATUS.

THE GAS MACHINERY CO.
CLEVELAND, OHIO.

LACLEDE-CHRISTY CLAY PRODUCTS CO.,

LACLEDE PLANT:
MANCHESTER AND
SULPHUR AVES.

ST. LOUIS, MO.

CHRISTY PLANT:
MORGANFORD ROAD &
GRAVOIS AVE.

SUCCESSOR TO

LACLEDE FIREBRICK MFG. CO. and CHRISTY FIRECLAY CO.

ENGINEERS AND BUILDERS OF GAS BENCHES AND GLASS PLANTS.

OUR OWN DESIGNS INCORPORATED IN OUR BENCHES OF HORIZONTAL, INCLINED AND VERTICAL RETORTS.

SPECIAL DESIGNS FOR GLASS FURNACES TO SUIT SPECIAL CONDITIONS.

LININGS FOR

LIME KILNS AND CUPOLAS,
REFUSE BURNERS, BRASS FURNACES,
WATER GAS SETS, HEATING FURNACES,
BAUXITE OR BASIC HOT ZONES,
ROTARY CEMENT KILNS.

LOCOMOTIVE TILE,
BOILER SETTINGS,
TANK FURNACE BLOCKS,
SEWER PIPE AND FITTINGS,
GAS BENCH SETTINGS,
GLASS HOUSE REFRACTORIES,
FLUE LININGS, CHIMNEY TOPS,
MILLED CLAYS,

FIREPROOFING,
GRATE SETTINGS,
KILN FLOOR TILE,
VITRIFIED CLAY PRODUCTS,
GAS RETORTS, CARBON TILE,
RETORT PATCHING CEMENT,
WASHED POT CLAYS,
FURNACE AND CRUDE CLAYS.

CLAY PRODUCTS OF EVERY DESCRIPTION.

Bray's Union-Jet.

ASK ANY GAS COMPANY WHO USES BRAY BURNERS WHY THEY USE THEM,

And their answers would contain more reasons than would fill this page. Reduced to a few words it would be—

Because they are more durable. They reduce complaints, and they bring out the full value of the gas.

Could you ask for better reasons?

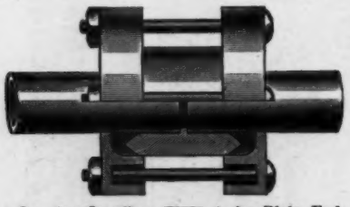
OUR BLUE BOOK WOULD INTEREST YOU. May we send it?

W. M. CRANE COMPANY,

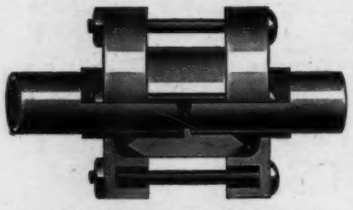
1131-33 Broadway, New York, N. Y.,

We make Gas Appliances of all kinds. SOLE AGENTS for BRAY BURNERS for the UNITED STATES and CANADA.

Self-Lighting Burner.



Regular Coupling, Style 1, for Plain End Wrought Iron Pipe.



Insulating Coupling, Style 8, for Plain End Wrought Iron Pipe,

Clamp, Style 4, for Repairing Leaks on Screw Collar.

Long Sleeve, Style 2, for Mending Broken Lines.

S. R. DRESSER MANUFACTURING CO.,

SUCCESSORS TO

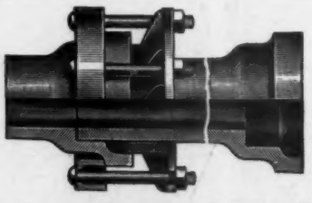
S. R. DRESSER,

BRADFORD, PA., U. S. A.,

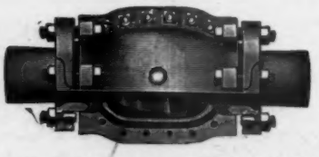
Patentee and Manufacturer of Specialties for Gas and Water Lines,

Pipe Couplings, Sleeves, Clamps, Crosses, Tees and Ells.

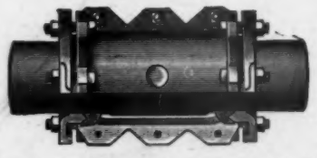
STATE REQUIREMENTS AND SEND FOR CATALOGUE.



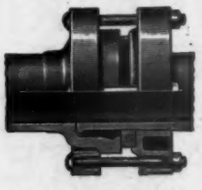
Coupling, Style 9, for Special Style Cast Iron Pipe.



Split Sleeve for Repairing Broken Bell on Cast Iron Pipe.

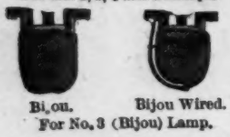


Split Sleeve for Repairing Broken or Cracked Cast Iron Pipe.



Clamp, Style 4½, for Repairing Leaky Lead or Cement Joints in Cast Iron Pipe.

No. 1 Plain. No. 1 Wired. For No. 1, 2, 4 and 5 Lamps.



Bijou. Bijou Wired. For No. 3 (Bijou) Lamp.

"Rico" Mantles.

Ramsdell

Our Mantles are the Standard Inverted Mantles, just as the RAMSDELL is the Standard Inverted Lamp. They are manufactured especially for the Ramsdell Lamps, being made of double woven Ramie and bearing our Trade Mark "RICO." Being made on our patented Mantle Ring, a firm hold is obtained on the porcelain cone, which prevents the mantle being jarred off the holder. This is an important feature of the "Rico" Mantles, and is one of the points which makes them the best mantles produced.

We have the exclusive control for the United States and Canada of the Farkas patents, covering the WIRE CAGED MANTLES such as are used abroad for Railway Car Lighting. This Mantle has been extensively used by us in the past two years on the Ramsdell Inverted Arcs and on other lamps where they are subjected to unusually severe requirements.

RAMSDELL INVERTED GAS LAMP CO., 530 Broadway, New York.

THE UNITED STATES.

PATENTED MAY 13, 1902.
"Self-Draining Meter."

THE UNITED STATES
Self-Draining Meter.

NO DUMPING OF METERS TO GET THE WATER OUT.

Saves Over 75 Per Cent. in Cost Annual Repairs.

Prices low. Extra heavy tin used. Demonstrations at our expense. Send for circular.

THE UNITED STATES METER CO., { 229-269 Chestnut St., Brooklyn, N. Y.

PARKER-RUSSELL MINING AND MFG. CO.,
ST. LOUIS, MO.

ST. LOUIS OFFICE: Suite 501-508 Liggett Building, 8th and Chestnut Streets.
NEW YORK OFFICE: 45 Broadway.

GAS RETORT BENCHES, STOKING MACHINERY, STAND-PIPE CLEANER AND STRAIGHT STAND-PIPE SYSTEM.

GAS RETORTS AND FIREBRICK.

We Manufacture Gas Retorts and Settings, Furnace Blocks and Fire Clay Tiles of Every Description.

Benches.--We erect GAS RETORT BENCHES with Horizontal retorts having closed ends up to 10 feet in length, or Through retorts up to 20 feet in length.

Slopers.--Also, SLOPERS on improved lines for Inclined Retorts.

Stoking Machinery.--Sole Agents for U. S. and Canada for the Fiddes-Aldridge Simultaneous Discharging Charger. The "F. A.," or "One-Stroke" Machine. Cost of Carbonizing reduced to minimum. No Dust. Silent. No Waste of Coal. No Injury to Retorts.

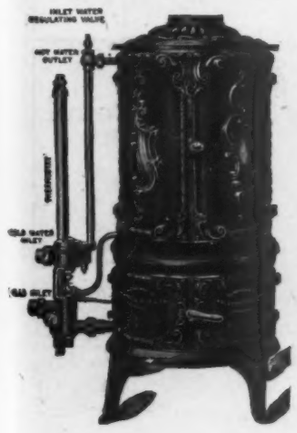
Water Gas Linings.--We make a specialty of WATER GAS BLOCKS, and supply brick of superior grade for checkerwork.

Stand-Pipe Cleaner and Straight Stand-Pipe System.--Agents for the sale of the Stand-Pipe Cleaner and Straight Stand-Pipe System of the United Gas Improvement Company.

Retort Houses and Conveying Machinery.--We also build Retort Houses, Coal and Coke Conveying Machinery. Plans, specifications and estimates cheerfully furnished.

CORRESPONDENCE SOLICITED.

ALL CONTRACTS MADE, AS OF ST. LOUIS.



Humphrey Auto-Thermal Pressure Water Heaters

Are the Most Perfect of Any.

SOME EXCLUSIVE FEATURES.

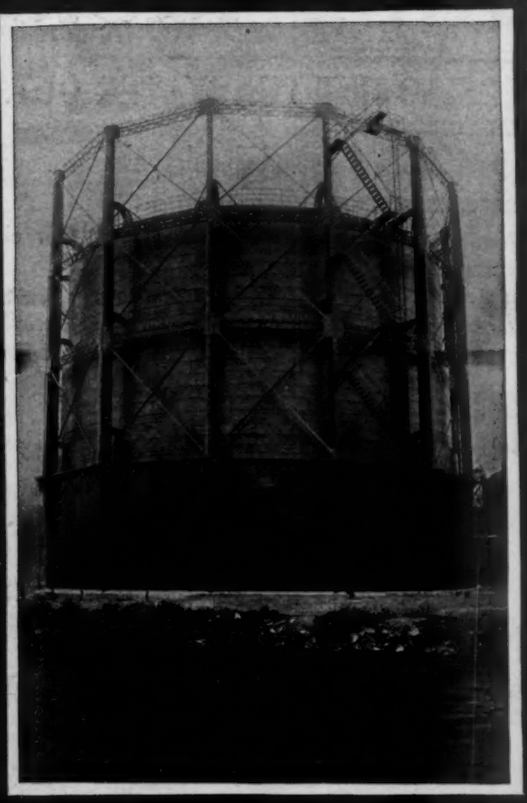
1. The smallest pilot light in the world.
2. The only pilot light automatically controlled. Construction patented.
3. An external thermostat, the most sensitive and positive. It cannot be superheated by the pilot light or hindered by lime. It insures safety, economy and reliability.
4. Multiple levers of thermostat all incased. Cannot be disturbed.
5. Simplest Automatic Valve ever made. Can't get out of order.

Shall we Send CATALOG No. 10 AND DISCOUNTS?

HUMPHREY CO., { Kalamazoo, Mich., U. S. A.

Binder FOR THE Journal. PRICE, $1.

For Sale by
A. M. CALLENDER & CO.,
42 Pine Street, New York City.



ARTHUR R. CRUSE, PRESIDENT.
HENRY W. SCATTERGOOD, VICE PRESIDENT & TREASURER.
FRANK FLAVELL, SECRETARY.

CRUSE-KEMPER COMPANY

PHILADELPHIA OFFICES: SUITE 1124 LAND TITLE BUILDING.
WORKS: AMBLER PA.

Manufacturers of

TRIPLE
DOUBLE and
SINGLE-LIFT
Gas Holders

WITH OR WITHOUT
METAL TANKS

Oil and Water Tanks
Purifier Covers
General Plate Metal Work and
Steel Water Towers

PLANS, SPECIFICATIONS AND ESTIMATES
PROMPTLY FURNISHED ON REQUEST

J. S. DeHART, JR., PRESIDENT
A. F. WEHNER, SECRETARY
R. K. WEHNER, TREASURER

ISBELL-PORTER COMPANY

GAS ENGINEERS & BUILDERS OF GAS WORKS

BENCH WORK

CHARGING AND DISCHARGING MACHINERY

MACKENZIE EXHAUSTERS

PRIMARY AND SECONDARY CONDENSERS FOR FRESH OR SALT WATER

ISBELL VALVES SPECIALS

TAR EXTRACTORS

P.&A. TAR EXTRACTORS FOR WATER GAS

ROTARY AMMONIA SCRUBBERS

SHAVING SCRUBBERS PURIFIERS STREET GOVERNORS

MAIN OFFICE AND WORKS
BRIDGE & OGDEN STREETS
NEWARK, N.J.
ESTABLISHED 1865

THE

Ludlow Valve Mfg. Co.,

TROY, N. Y., U. S. A.

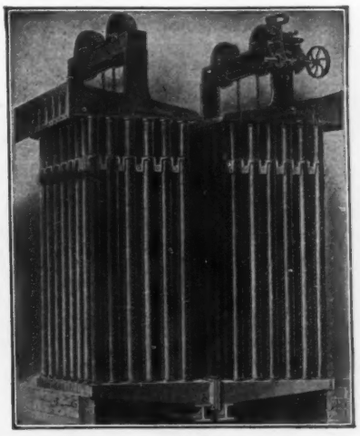
Double and Single Gate Valves, ¼" to 72",

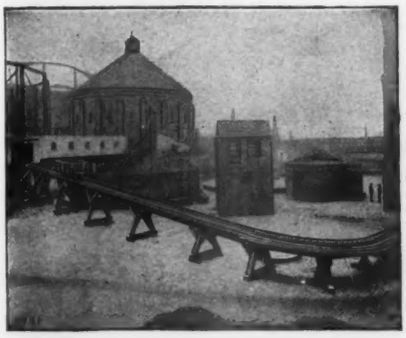
—FOR—

Gas, Water, Steam, Oil, Ammonia, Etc.

HOT GAS VALVES A SPECIALTY.

Send for Catalogue.





HUNT CABLE RAILWAYS

For Handling Coal and Coke in Gas Works.

The cost of handling coal and coke by this method is only the expense of loading the cars (one man) and the power to drive the cable. Every inch of ground is available, as the space under the trestles can be utilized for storage, if necessary. These railways are built of different types, to handle any quantity of material, large or small.

If you are interested in the subject, we will take pleasure in sending you photographs of some of the plants we have installed upon receipt of your card, and will give such information as is in our power if you will let us know your requirements.

C. W. HUNT CO., West New Brighton, N. Y. 45 Broadway, New York.

SAVE 15 PER CENT. OF THE COAL IN MAKING WATER GAS.

For every 1,000 cu. ft. of water gas 40 to 48 lbs. of anthracite are consumed in the generator, while 24 lbs. should theoretically be enough. The 40 per cent. to 50 per cent. excess is the margin of possible saving. By passing the hot, waste, stack-valve gases through a GREEN AIR HEATER you can cut down the bill for generator coal by at least 10 per cent. The air forced to the generator is passed through the tubes of the Air Heater and absorbs the waste heat from the stack-valve gases and returns it to the generator. The higher temperature in the generator, carburetter and superheater results, also, in a saving of oil, amounting to about one-fifth gallon per 1,000 cu. ft. of gas.

After the stack-valve gases have passed through the Green Air Heater they may be then passed through a GREEN FUEL ECONOMIZER to heat the boiler feed water, saving as much as 25 per cent. of the boiler fuel. The result is that a Green Air Heater and a Green Fuel Economizer will save from 50 per cent. to 60 per cent. of their first cost annually in a water gas plant. Write for circular "AG" and results of actual tests.

THE GREEN FUEL ECONOMIZER CO.,

MATTEAWAN, N. Y.

(Sole builders of the Green Fuel Economizer in the United States, and of Fans, Blowers and Exhausters.)

ARTHUR E. BOARDMAN, C.E.,

For several years associated with the late CAPTAIN WILLIAM HENRY WHITE,

WILL CONTINUE THE BUSINESS OF

CONSULTING ENGINEER

For Gas, Water and Electric Light Companies, at No. 41 Wall Street, Room 1707, New York.

TELEPHONE, 5534 BROAD.

ESTABLISHED 1856.

HENRY MAURER & SON,

Manufacturers of

High Grade Firebrick, Blocks, Tiles,

ETC.,

Works: Maurer, N. J. Office: 420 E. 23d St., N. Y. City.

Bristol's Recording Pressure Gauges

—(ALL RANGES).—

Used the World Over.

Necessary Equipment

Write for Catalogue A.

For Every Gas Plant.

New York: 114 Liberty St.

Chicago: 753 Monadnock Bldg.

The Bristol Co., Waterbury, Conn., U S.A.

12-inch High Pressure Governor

REYNOLDS' GAS REGULATOR COMPANY,

ANDERSON, IND., U. S. A.

We make all sizes for all classes of reduction,

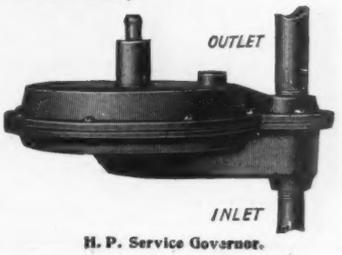
DOUBLE and SINGLE DISTRICT STATIONS,

And Individual Service Governors for Reducing High Pressure.

HOLDER GOVERNORS

And Low Pressure Regulators, all of the Dry Diaphragm type.

Write for Catalog.



H. P. Service Governor.

LLOYD CONSTRUCTION COMPANY

129,800,000

Cu. Ft. Capacity of

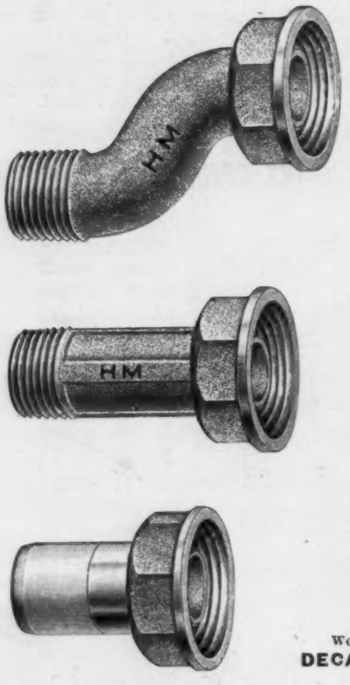
. LLOYD'S P. & A.

TAR EXTRACTORS

In Daily Use.

There's a Reason.

DETROIT—MICHIGAN



MUELLER
GAS METER UNION
COUPLINGS.

A leaky Gas Meter Union Coupling means one of two things—a loss to you or an unjust expense to your patron.

There is no need of either condition. Mueller Gas Meter Union Couplings are made of the best red brass—no scrap—no pin holes or defects to cause leaks.

Furnished in any quantity, any style, and Unconditionally Guaranteed.

Prompt shipments. Prices on application.

MUELLER

H. MUELLER MFG. CO,

Works and General Offices,
DECATUR, ILL., U. S. A.
West Cerro Gordo St.

Eastern Division,
NEW YORK, N. Y., U. S. A.
254-258 Canal St. (cor. Lafayette).

ROOTS' GAS EXHAUSTERS.

Installation showing our latest improved machines, with flexible rope coupling, for large units.

SEND FOR CATALOGUE.

HOME OFFICE:
Connersville, Ind.

NEW YORK OFFICE:
120-122 Liberty St.

CHICAGO OFFICE:
1547 Marquette Building.

Send for pocket edition of Engineers' practical reference book.

Shows up GOODS as they ARE
Have you Seen the
WHITE AND GOLD ENAMELED HUMPHREY ARC?
Handsome, Durable, High Power.
Sure to Bring in New Lighting Business.

GENERAL GAS LIGHT CO.,
KALAMAZOO, MICH.

NEW YORK CITY:
46 West Broadway.

SAN FRANCISCO.
519 Eddy Street.

GEORGE ORMROD, Pres. & Treas. JOHN D. ORMROD, Supt.
J. G. EBERLEIN, Secretary.

EMAUS PIPE FOUNDRY.

DONALDSON IRON COMPANY. EMAUS, PA.

CAST IRON GAS & WATER PIPE

MANUFACTURERS OF

CAST IRON PIPE AND SPECIAL CASTINGS

FOR WATER AND GAS.

Also, FLANGE PIPE, LAMP POSTS, Etc.

GAS TAPPING MACHINES

—FOR—

Drilling and Tapping Pipe under Pressure

WITHOUT ANY ESCAPE OF GAS.

They are Strong and Compact.

Size of Combination Drills and Taps ¾ to 4-inch.

Machines Sent to any Gas Company for Thirty Days' Trial.

Send for Circulars.

Geo. Light,
DAYTON, O.

"THE MINER"

Globe Street and Boulevard Lamps.

Cheapest and Best

THOUSANDS IN USE WITH INCANDESCENT BURNERS.

Send for Catalogues.

THOMAS T. W. MINER,
821-823 Eagle Av., N.Y.

GASHOLDER TANKS AND GAS WORKS MASONRY COMPLETE.

Plans prepared and Estimates furnished at short notice.

J. P. WHITTIER,
238 Java Street, Brooklyn, N. Y.

WARREN FOUNDRY AND MACHINE CO.,

Established 1856. Works at Phillipsburgh, N. J.

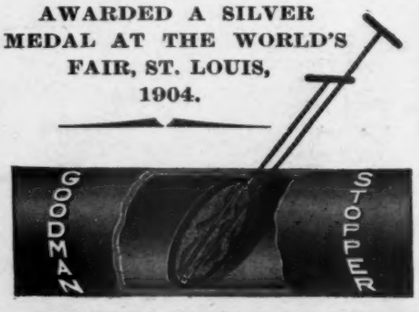
New York Office, 170 Broadway.

CAST IRON WATER AND GAS PIPE,

FROM THREE TO FORTY-EIGHT INCHES DIAMETER. ALSO, ALL SIZES OF

Flange Pipe for Sugar House and Mine Work. Branches, Bends, Retorts, etc., etc.

AWARDED A SILVER MEDAL AT THE WORLD'S FAIR, ST. LOUIS, 1904.



SAFETY GAS MAIN STOPPER CO.,

257-263 East 133d Street,
NEW YORK CITY.

Chollar's System of Gas Purification.

THE PURIFIED GAS REVIVES THE FOULED OXIDE.

The Follett Time Stamp

Can be Used for so Many Purposes it would Take a Book to Name them. . . .

Address,
A. ANDERSON, JR.,
247 W. 51st St.,
NEW YORK.

Practical Handbook on

GAS ENGINES,

With Instructions for Care and Working of the Same,

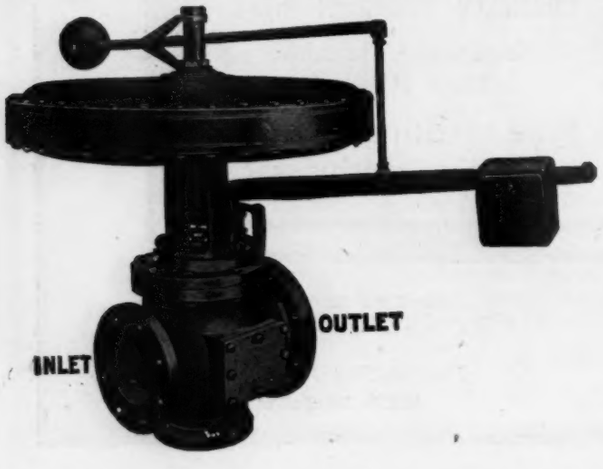
By G. LIECKFELD, C.E.

Translated with Permission of the Author, By GEO. M. RICHMOND, M.E.

Price, $1.

For Sale by

A. M. CALLENDER & CO.,
42 Pine Street, - - - - New York City.



THE FULTON GAS PRESSURE GOVERNOR,

WITH AUTOMATIC SAFETY CUTOFF.

For Artificial or Natural Gas.
For District or Service Use.

Our DUPLEX SENSITIVE GOVERNOR, with Automatic Cutoff for district service, will reduce high pressure gas to inches of water without variation.

Absolutely safe and reliable. No complicated mechanism to get out of order. More than 20 years' experience with the largest gas companies.

SEND FOR LATEST CATALOG.

THE CHAPLIN-FULTON MFG. CO.,
28-30 PENN AVE., PITTSBURGH, PA.

AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

NOVEMBER, 1907.

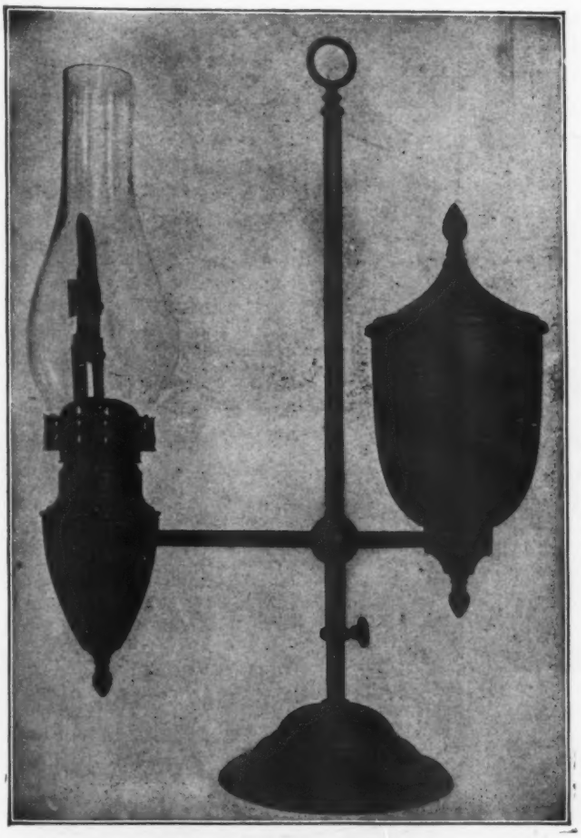
Table No. 1.
FOLLOWING THE MOON.

Day of Week.	Date.	Light.	Extinguish.
Fri.	1	5.30 PM	3.40 AM
Sat.	2	5.30	5.30
Sun.	3	5.20	5.30
Mon.	4	5.20	5.30
Tue.	5	5.20 NM	5.30
Wed.	6	5.20	5.30
Thu.	7	5.20	5.30
Fri.	8	5.20	5.30
Sat.	9	5 20	5.30
Sun	10	8.20	5.40
Mon.	11	9.20	5.40
Tue.	12	10.30 FQ	5.40
Wed.	13	11.40	5.40
Thu.	14	12.50 AM	5.40
Fri.	15	2.00	5.40
Sat.	16	3.00	5.40
Sun.	17	4.10	5.50
Mon.	18	No L.	No L.
Tue.	19	No L FM	No L.
Wed.	20	No L.	No L.
Thu.	21	5.10 PM	7.00 PM
Fri.	22	5.10	7.50
Sat.	23	5.10	8.40
Sun.	24	5.10	9 30
Mon.	25	5.10	10.20
Tue.	26	5.10	11.20
Wed.	27	5.10 LQ	12.20 AM
Thu.	28	5.10	1.20
Fri.	29	5.10	2.20
Sat.	30	5.10	3.30

TOTAL HOURS DURING 1907.

By Table No. 1.

	Hrs.Min.
January	211.10
February	193.40
March	182.10
April	167.00
May	157.00
June	145.30
July	151.50
August	162.30
September	175.30
October	202.40
November	209.30
December	231.50
Total, yr.	2190.20



THE ELLIOTT KEROSENE STANDARD PHOTOMETER LAMP.

****

10-Candle Power.

****

This lamp is a perfect substitute for the 10-candle Pentane Lamp hitherto used, and has the following advantages:

1st. It uses Standard Kerosene Oil (Pratt's Astral Oil or equivalent).

2d. It is remarkably steady. Will burn 24 hours continuously with less than 2 per cent. variation.

3d. It is much less dangerous than Pentane, which is a kind of gasolene.

4th. It is not easily affected by air currents in the photometer room.

5th. Since the lamp may burn continuously, the candle power of gas may be taken at any moment, if necessary. This insures steady illuminating power without waste of carburetting material.

6th. The first cost of the lamp brings it within the reach of even small gas works.

7th. Costs much less to maintain than a Pentane lamp or sperm candles doing the same service.

8th. Is not affected by the weather.

PUBLIC LIGHTING TABLE.

NOVEMBER, 1907.

Table No. 2.
NEW YORK CITY.
All Night Lighting.

Day of Week.	Date.	Light	Extinguish.
		P. M.	A.M.
Fri.	1	4.45	5 35
Sat.	2	4.45	5 35
Sun.	3	4 45	5.35
Mon.	4	4.45	5.35
Tue.	5	4 40	5.45
Wed.	6	4.40	5.45
Thu.	7	4.40	5 45
Fri.	8	4.40	5.45
Sat.	9	4.40	5.45
Sun.	10	4 40	5.45
Mon.	11	4 40	5.45
Tue.	12	4 30	6.00
Wed.	13	4 30	6 00
Thu.	14	4 30	6.00
Fri.	15	4 30	6 00
Sat.	16	4 30	6.00
Sun.	17	4.30	6.00
Mon.	18	4.30	6.00
Tue.	19	4 25	6 00
Wed.	20	4 25	6.00
Thu.	21	4.25	6.00
Fri.	22	4 25	6.00
Sat.	23	4 25	6 00
Sun.	24	4 25	6.00
Mon.	25	4 25	6 00
Tue.	26	4.20	6.10
Wed.	27	4 20	6.10
Thu.	28	4 20	6.10
Fri.	29	4.20	6 10
Sat.	30	4.20	6.10

TOTAL HOURS DURING 1907.

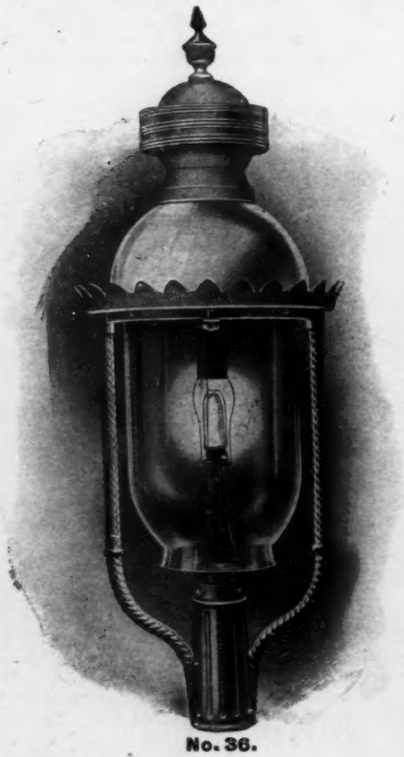
By Table No. 2.

	Hrs.Min.
January	423.20
February	355.25
March	355.35
April	298.50
May	264.50
June	234.25
July	243.45
August	280.25
September	321.15
October	374.30
November	401.40
December	433.45
Total, yr.	3987.45

NEW YORK, 318 West 42d Street. BOSTON, 820 Beacon Building. PHILADELPHIA, Broad and Arch Streets. ST. LOUIS, 712 Roe Building. CHICAGO, 218 La Salle Street. SAN FRANCISCO, 512 Oak Street.

WELSBACH STREET LIGHTING COMPANY

....OF AMERICA....



No. 36.

Controls and Operates the **Welsbach System of Street Lighting,**

Which includes its specially DESIGNED and PATENTED BURNER for PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.

No. 38.

INVERTED REFLEX TRADE MARK GAS LIGHT

Succeeds and Excels the Electric Light at One-Quarter the Cost.

THE BURNER.

Elegance of Appearance.
Best Possible Material and Workmanship.
Perfect Combustion.
Lowest Gas Consumption.
Highest Candle Power.
Will Fit Any Fixture.
Will Not Flash Back.
Will Not Blacken Mantles.
Will Not Discolor Fixtures.
Will Not Discolor Ceilings.

THE MANTLE.

Best Welsbach Quality.
Extra Strong and Durable.
Highest Maintained Candle Power.
Rich Mellow Light.

THE GLASSWARE.

Highest Quality Imported.
Special Design Inner Cylinder (No. 317).
Protection from the Falling of Heated Particles.
Increases Candle Power.

Manufactured by

WELSBACH COMPANY.

FACTORIES:

Gloucester, N. J. Chicago, Ill.

Salesrooms in all leading cities of the United States.

WRITE FOR DISCOUNTS.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

LESSEES, OPERATORS AND BUILDERS OF GAS WORKS.

LARGEST BUILDERS OF

CARBURETTED WATER GAS PLANT IN THE WORLD.

SOLE BUILDERS OF THE Standard Double-Superheater Lowe Water Gas Apparatus.

1907 CONTRACTS.

PARTIAL LIST OF PLACES:

Newburgh, N. Y.
Helena, Mont.
Bridgeport, Conn. (3d contract).
Suffolk, Va.
Winsted, Conn. (2d contract).
Nashua, N. H.
Augusta, Me. (2d contract).
Everett, Mass.
Jenkintown, Pa. (2d contract).
Coney Island, N. Y.
Mexico, Mo.
Jacksonville, Fla.
Syracuse, N. Y. (2d contract).
Atlanta, Ga. (3d contract).
Holyoke, Mass.
Peoria, Ills.
Schnectady, N. Y. (2d contract).
Danbury, Conn.
Galveston, Tex. (2d contract).
Quebec, Canada.
Indianapolis, Ind. (2d contract).
Bessemer, Ala.
Waterbury, Conn. (5th contract).
Sioux Falls, S. D. (3d contract).
Philadelphia, Pa.

TOTAL SETS INSTALLED TO JULY 1, 1907, ... 34
TOTAL SETS TO DATE, ... 668
TOTAL DAILY CAPACITY, ... 541,655,000 cu. ft.

Tar Extractors for Carburetted Water Gas.
Photometrical Apparatus.
Gas Analysis Apparatus.
Recording Gauges.
Straight Standpipe System for Coal Gas Retorts.
Straight Standpipe Cleaners.

Established 1858. Incorporated 1890.
CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
Jersey City, N. J.

MANUFACTURERS OF

CLAY GAS RETORTS, FIRE CLAY TILES, FIRE BRICK and FIRE CLAY SPECIALTIES.

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

SOLE MANUFACTURERS OF THE

FLEMMING GENERATOR GAS FURNACE

The Gas Engineer's Pocket-Book,

By HENRY O'CONNOR.

Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works.

PRICE, $3.50.

For Sale by

A. M. CALLENDER & CO., 42 Pine Street, New York City.

ESTABLISHED 1868.
L. N. RANCKE, Vice-Pres. & Mgr. F. SCHIAFFINO, Sec'y & Treas.

BALTIMORE RETORT & FIREBRICK CO.

BALTIMORE, MD.,

Manufacturers of all Material for the Construction of Coal Gas Benches.

HALF AND FULL DEPTH AND FREE FIRING BENCHES,

All styles of which we have in operation, equipped with the BEST of LATEST IMPROVEMENTS, proving our claim for SUPERIOR QUALITY and EFFICIENCY.

INCLINES—We have in SUCCESSFUL OPERATION benches of Inclined Retorts, MANUFACTURED and ERECTED by us.

WALDO BROS., 102 MILK ST., BOSTON, MASS.,
Agents for New England States.

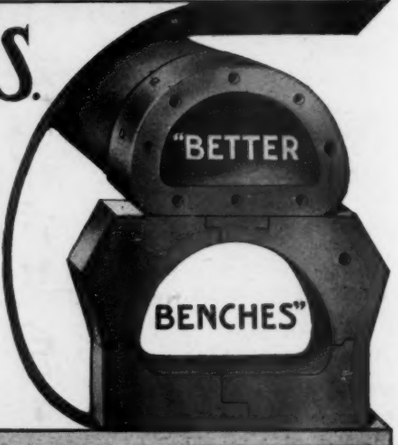
LARGE FACILITIES—Correspondence Solicited.
RAIL and WATER CONNECTIONS to ALL POINTS.

L. C. HAMLINK, PRES. AUGUST COURT, SECY.

GAS BENCH CONSTRUCTION CO.

LINMAR BUILDING. ST. LOUIS, MO.

**COAL GAS BENCHES.
BENCH FILLINGS.
WATER GAS
LININGS.**



"CHRISTY" REFRACTORIES USED IN "BETTER BENCHES"

JOHN DELL,
President and General Manager.

MISSOURI FIRE BRICK CO.,

ESTABLISHED 1882.

MANUFACTURERS OF

Gas Retorts, Bench Settings, Fire Brick, Cupola Linings, Etc.

We are the **Exclusive Agents** *for the* **Mitchell Patent Benches,** *Constructed with Half or Full Depth Furnaces, to Burn either Coal or Coke, and Arranged for Front or* **Rear Clinkering.** **The Mitchell** *is the* **Original Coal Firing Bench.** *We also Erect Plain Benches with* **One to Six Retorts.**

YOUR CORRESPONDENCE IS RESPECTFULLY SOLICITED.

City Office: *411 Olive Street, Continental Bank,* ST. LOUIS, MO.

Newbigging's Handbook for Gas Engineers and Managers. Price, $6.50. For Sale by A. M. Callender & Co., 42 Pine St., N. Y. City.

Bronder Patent Stoking Machinery.

Three-Scoop and Three-Rake Charging and Discharging Machines are operating in New York, Newark, N. J., Philadelphia, Worcester, Mass., Mt. Vernon, N. Y., Toronto and Montreal, Canada, Detroit, Seattle, Rochester and St. Louis.

Four-Scoop and Four-Rake Charging and Discharging Machines are operating in Detroit, Mich., and Cincinnati, Ohio. These are the only machines that will draw or charge simultaneously 3 or 4 retorts (vertically) and handle from 42 to 60 retorts in from 25 to 30 minutes, lid opening and closing and filling of furnaces included.

Hot Coke Conveyor, Quencher and Steam Exhauster, operating in Toronto, Canada, working in water-sealed flue, rollers being protected from heat and grit.

COAL CRUSHERS, CONVEYORS AND BINS. TURNTABLES FOR MACHINES.

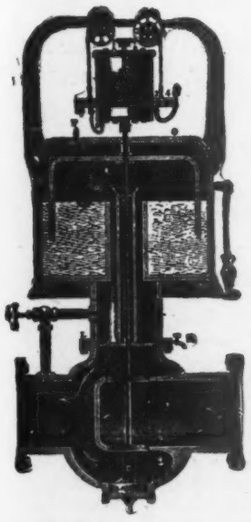
Labor-Saving Machines for Handling Coal and Coke from Coal Cars to Coke Yard or Bins. Coke Screening and Measuring Plants a Specialty.

G. A. BRONDER,

Contracting Engineer and Builder,

229 BROADWAY, NEW YORK

CONNELLY IRON SPONGE AND GOVERNOR CO.,



Design, Construction and Extension of

COAL OR WATER GAS PLANTS,

Automatic, Balance High Pressure and Service Governors.

Roots Improved Gas Exhausters,

Iron Sponge, Purifying Material, for Gas Purification, Jones Jet Photometers, Pressure Registers, etc.,

INSTALLATION OF SMOKELESS TAR BURNING SYSTEM.

Reinforced Concrete Construction for all Purposes

Wide Experience in High Pressure Installation and Extension.

GAS SPECIALTIES.

395 Broadway, New York.

295 West 22d Street, Chicago, Ills.

STAMFORD ODORLESS HEATERS

ARE

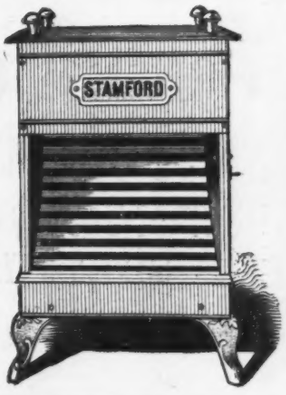
BEST BY TEST.

WRITE TO-DAY FOR NEW CATALOG.

MADE IN A VARIETY OF STYLES AND SIZES.

STAMFORD GAS STOVE CO.,

STAMFORD, CONN.



1907 DIRECTORY 1907

OF AMERICAN GAS COMPANIES.

Price, - - - - - - - - $5.00.

A. M. CALLENDER & CO., 42 Pine Street, New York City.

JAMES D. PERKINS, President. F. SEAVERNS, Treasurer.

THE PERKINS COMPANY,

228 and 229 Produce Exchange, New York City.

OCEAN MINE YOUGHIOGHENY GAS COAL,
OLD KENTUCKY SHALE AND O. K. BOGHEAD.

BERWIND-WHITE COAL MINING COMPANY'S

Ocean Westmoreland Gas Coal.

Offices:
Washington Building, New York.
Betz Building, Philadelphia.

STRICTLY High Grade. . . . .
Carefully Prepared.
For Gas Making or
Heavy Steaming. .

A. C. M. AZOY, General Agent, 1 Broadway, New York.

NAPHTHALENE SOLVENT.

Cheap and Efficient.

For Use in Works, Mains and Service Pipes. Shipped in 100-gallon Drums.

Semet-Solvay Co.,
Syracuse, N. Y.

JEFFREY COAL AND ASH HANDLING SYSTEMS

FOR POWER PLANTS

Insure a Saving of 50 to 75 per ct.

Views of the Globe-Wernicke Co.'s power house, equipped with Jeffrey Machinery. An apron carrier takes coal from crusher to feeding hopper which loads the swivel buckets.

Bulletins B and C mailed free with Catalogs on ELEVATING, CONVEYING, CRUSHING, SCREENING, DRILLING, MINING MACHINERY.

The JEFFREY MANUFACTURING CO.,
COLUMBUS, OHIO, U. S. A.

New York. Chicago. St. Louis. Pittsburgh. Boston. Denver. Knoxville. Philadelphia. Montreal, Canada. Charleston, W. Va.

ISAAC C. BAXTER, President. ESTABLISHED 1864. PETER YOUNG, Secretary and Treasurer.

Works. LOCKPORT STATION, PA.

JAMES GARDNER, JR., CO.,

Successor to WILLIAM GARDNER & SON.

Address all communications to JAMES GARDNER, JR., CO., Bolivar, Pa.

Fire Clay Goods for Gas Works.

GAS ANALYST'S MANUAL. By JAQUES ABADY. Price, $6.50. For Sale by A. M. Callender & Co., 42 Pine St., N. Y. City.

KELLER ADJUSTABLE COKE CRUSHER.

Strong, Simple, Durable. Will Crush any Size Desired.

C. M. KELLER,
Sec. & Supt. Gas Lt. & Coke Co.,
Columbus, Ind.
Correspondence Solicited.

THE ECONOMICAL GAS APPARATUS CONSTRUCTION COMPANY, LIMITED,

Consulting Engineers.

Builders of UP-TO-DATE Machinery and Appliances for Coal and Water Gas Plants. :: :: :: :: ::

PLANS,
SPECIFICATIONS
AND ESTIMATES
PREPARED

AMERICAN OFFICE:
269 Front St., East, Toronto, Canada.

BAXTER & YOUNG,

CONTRACTING AND CONSULTING GAS ENGINEERS.

Examination and Values Ascertained of Artificial and Natural Gas Properties.

COMPLETE GAS WORKS ERECTED.

Artificial and Natural Gas Mains Furnished and Laid.

GAS PROPERTIES PURCHASED.

OFFICE: WAYNE COUNTY BANK BUILDING,
Rooms 201 & 202. DETROIT, MICH.

EDMUND H. McCULLOUGH, President. H. C. ADAMS, Vice-President. CHAS. F. GODSHALL, Treasurer. HENRY WHARTON, Secretary. C. B. NICHOLS, Assistant Secretary.

THE WESTMORELAND COAL CO.

Chartered 1854.

Mines situated on the Pennsylvania and the Baltimore and Ohio Railroads, in Westmoreland County, Pa.

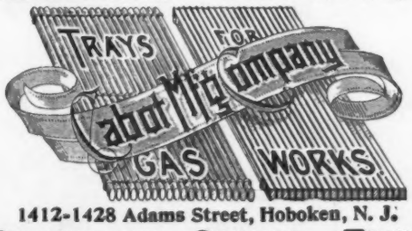
POINTS OF SHIPMENT:

PHILADELPHIA, BALTIMORE, SOUTH AMBOY, N. J.,
WATKINS (SENECA LAKE), N. Y.

Since the commencement of operations by this Company its well-known Coal has been largely used by the Gas Companies of New England and the Middle States, and its character is established as having no superior in gas-giving qualities, and in freedom from sulphur and other impurities.

Principal Office, 224 South 3d St., Phila., Pa.

JOHN CABOT, President. GEO. D. CABOT, Secretary.



1412-1428 Adams Street, Hoboken, N. J.

PURIFIER AND SCRUBBER TRAYS
OF ALL KINDS.

Church's Patent Trays.

Reversible; Strongest; Most Easily Repaired.

Special Trays for Iron Oxide.

We also Supply the Cheapest and Strongest

Reversible Bolted Trays.

PATENTS, TRADE MARKS, COPYRIGHTS.

ROYAL E. BURNHAM,

Solicitor of Patents and Counsellor in Patent Causes.

833 Bond Building, Washington, D. C.

Send for Pamphlet on Patents.

Gas Engineer's Pocket-book, —BY— HENRY O'CONNOR.

Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works. PRICE, $3.50. For Sale by A. M. Callender & Co., 42 Pine St., New York City.

GAS ANALYST'S MANUAL,

By JAQUES ABADY, M. Inst. Mech. E.

(Incorporating F. W. Hartley's "Gas Analyst's Manual" and "Gas Measurement.")

Ninety-three Illustrations and Nine Folding Plates. Bound in Handsome Half Leather. Price, $6.50.

For Sale by **A. M. CALLENDER & Co., 42 Pine St., New York City.**

Standard Oil Company,

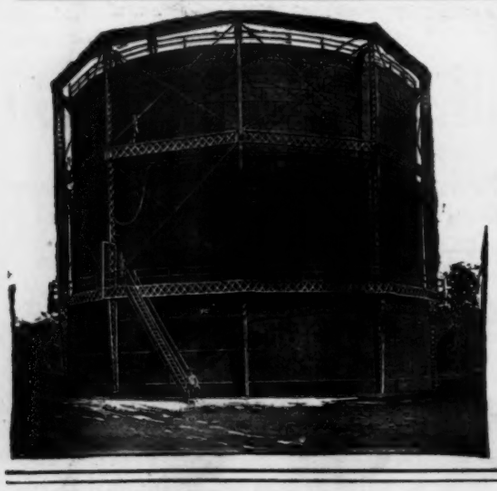
GAS NAPTHA DEPARTMENT.

GAS NAPTHA.

GAS OIL.

Correspondence Solicited.

26 Broadway, New York City.



DAVIS & FARNUM MFG. CO.,
Principal Office and Works, Waltham, Mass.

Single, Double and Triple-Lift Gasholders of any Capacity. Tubular, Pipe and Sinuous Friction Condensers of all Sizes.

Steel Tanks for Gasholders, Iron Roof Frames and Floors, Purifying Boxes, Center Seal or Valve Connections, Bench Work, Reversible Lime Trays.

Self-Sealing and Pressed Steel Mouthpiece Lids.

Coke Barrows, Coal Wagons, and all Apparatus Requisite for a Complete Gas Works.

Also, Gas and Water Pipe, Flanged Pipe, Sugar House Work, and Special Castings of all Descriptions.

H. M. BYLLESBY & COMPANY
(INCORPORATED),

GAS ENGINEERS,

DESIGN, CONSTRUCT AND OPERATE
COMPLETE COAL, WATER AND CRUDE OIL GAS PLANTS.

EXAMINATIONS AND REPORTS.

AMERICAN TRUST BUILDING
CHICAGO.

Oklahoma City, Okla. Mobile, Ala. San Diego, Cal.

QUINTARD IRON WORKS,
N. F. PALMER,

Foot of 12th St. & East River, New York,

MANUFACTURERS OF

GAS APPARATUS.

Complete Works Erected.

FREDERICK W. FLOYD, Engineer.

ALEX. C. HUMPHREYS, M.E., M. Inst. C.E. ARTHUR G. GLASGOW, M.E., M. Inst. C.E.

HUMPHREYS & GLASGOW,
CONSULTING ENGINEERS.

BANK OF COMMERCE BLDG.,
31 Nassau Street,
New York.

38 VICTORIA STREET,
London, S. W.,
England.

ADVICE AS TO EXTENSION AND RECONSTRUCTION OF GAS AND ELECTRICITY PLANT.

COMPLETE EXAMINATIONS MADE.
PROPERTIES PURCHASED.

ALCOHOL, Its Manufacture from Farm Products and De-Naturing,
By F. B. WRIGHT.

A NEW AMERICAN BOOK.

CONTENTS.

Chapter 1. Alcohol, its various forms and sources.
" 2. Mashing, cooling and fermentation in general.
" 3. Distillation, simple forms of stills, the production of Alcohol from wine.
" 4. Malting.
" 5. Alcohol from Potatoes, mashing, fermentation, distillations, Continuous stills.
Chapter 6. Alcohol from Grain.
" 7. Alcohol from Beets.
" 8. Alcohol from Sorghum and Molasses.
" 9. De-natured Alcohol and its Commercial uses.
" 10. Alcoholometry. Index.

Fully Illustrated with Original Drawings of Necessary Apparatus.

PRICE, $1. For Sale by

A. M. CALLENDER & CO., 42 PINE ST., NEW YORK CITY.

Bartlett, Hayward & Company,

Baltimore, Md. 100 Broadway, New York.

GASHOLDERS,

Coal and Water Gas Plants.

KERR MURRAY MANUFACTURING COMPANY,

Engineers and Manufacturers

APPARATUS FOR COAL GAS PLANTS,

SINGLE AND DOUBLE-LIFT GASHOLDERS
AND STEEL TANKS,

Latest Improved

ROTARY EXHAUSTERS, P. & A. TAR EXTRACTORS, AMMONIA WASHERS,

CONDENSING, SCRUBBING AND PURIFYING APPARATUS.

Street Specials and Valves.

ADDRESS:

KERR MURRAY MANUFACTURING COMPANY, {FORT WAYNE, IND.

R. D. WOOD & CO.,

400 CHESTNUT ST., PHILADELPHIA,

MANUFACTURERS OF

Cast Iron Pipe.

HEAVY LOAM CASTINGS,

Dunham Specials,

Hydraulic Work,

LAMP POSTS, VALVES, ETC.,

Gas Power Plants with Producers.

BUILDERS OF

Gasholders.

Single or Multiple Lifts, with or without Metal Tanks.

PURIFIERS, CONDENSERS, SCRUBBERS, BENCH WORK.

Cutler's Patent Freezing Preventer for Holder Cups.

Double Gate Valves.

A LARGE STOCK ON HAND READY FOR PROMPT SHIPMENT.

These valves are provided with double discs or gates, and are tight with the gas pressure on either side of them.

The discs are so arranged as to be free from their seats when being opened or closed, and are operated by a quick-acting mechanism. The valve stem extends outside of the bonnet, and serves as an index, showing whether the valve is closed or open, and the amount of opening. They are made of the following dimensions:

Size.....	8 inches	10 inches	12 inches	16 inches	20 inches	24 inches	30 inches	36 inches
Diameter of flanges...	13 inches	16 inches	18 inches	22½ inches	27 inches	31 inches	38½ inches	44 inches
Face to face of flange...	12 inches	12 inches	12 inches	14 inches	17 inches	20 inches	21 inches	23¾ inches

For price and other information, apply to

THE CONTINENTAL IRON WORKS,

P. O. STATION G. NEW YORK (BOROUGH OF BROOKLYN).

FRANK D. MOSES,

Telephone, 1503-D TRENTON, N. J., Telephone, 1503-L

Constructing Engineer and Contractor.

Estimates Furnished on any kind of Work in Connection with Gas or Water Plants.

SPECIAL ATTENTION GIVEN TO THE REMODELLING AND EXTENDING OF THE PROPERTIES OF WORKS NOT UP-TO-DATE

CORRESPONDENCE SOLICITED.

GEROULD'S IMPROVED RETORT CEMENT.

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick.

Price List, f.o.b. PITTSBURGH, PA.

In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 200 " " 6 " "
In Kegs less than 100 " " 7 " "

C. L. GEROULD,

1200 Bank for Savings Bldg., Pittsburgh, Pa.

MAIN AND SERVICE LAYING.

Gas and water companies about to lay new mains or services will find it useful to communicate with us. Our gangs are experienced and our plant is completely equipped for street main and service laying in all branches. These are our specialties. We are in a position to quote prices which will attract the attention of the economical manager.

Gas Company References. Correspondence Solicited.

Telephone, 302 Flushing. SULLIVAN BROS., Flushing, N. Y.

THE STACEY MANUFACTURING COMPANY,

GAS ENGINEERS AND BUILDERS,

GASHOLDERS.

MAIN OFFICE AND WORKS, - - Station P, Cincinnati, Ohio.
WESTERN OFFICE, - - - - - 519 Eddy St., San Francisco, Cal.

RITER-CONLEY COMPANY,

GASHOLDERS, with or without Steel Tanks.

Purifiers, Condensers, Scrubbers, Oil Tanks, Smoke Stacks.

STEEL ROOFS and BUILDINGS.

PLATE AND STRUCTURAL WORK OF EVERY DESCRIPTION.

GENERAL OFFICE: Pittsburgh, Pa. EASTERN OFFICE: 111 Broadway, New York City.

AMERICAN GAS ENGINEERING PRACTICE,

A HANDBOOK FOR ALL ENGAGED IN THE INDUSTRY,

Comprising Many Details Not Heretofore Published,

By M. NISBET LATTA, C.E.,

PART I. WATER GAS MANUFACTURE. The Generator. The Carburetter. The Superheater. Wash Box and Tar Scrubbers. Condensers. Purifiers. Exhausters. Station Meters. Holders. Details of Works' Operation.

" II. GAS DISTRIBUTION. Naphthaline. Mains. Services. Consumers' Meters. Pressure. House Piping. Appliances.

" III. GENERAL TECHNICAL DATA. Properties of Gases. Steam. Mathematical Tables. Conversion Factors. Pipe and Miscellaneous Data.

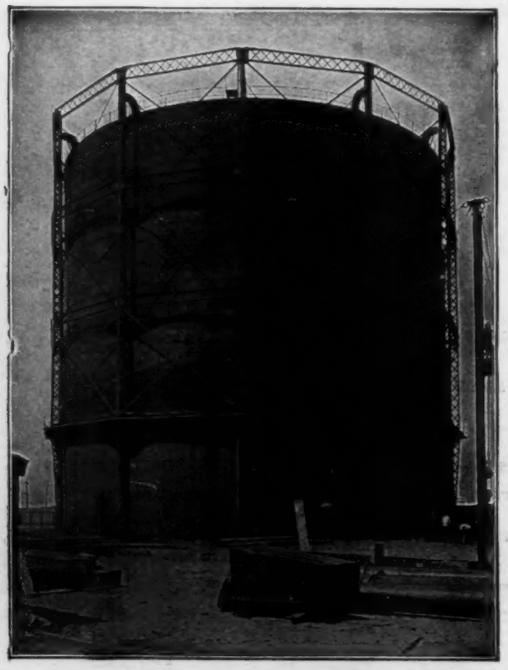
Price, $4.50. For Sale by

A. M. CALLENDER & CO., 42 PINE ST., NEW YORK CITY.

Newbigging's Handbook for Gas Engineers and Managers.

PRICE, $6.50.

A. M. CALLENDER & CO., 42 Pine Street, New York City.



Deily & Fowler,

39 Laurel Street, Philadelphia, Pa.

(ESTABLISHED 1842),

BUILDERS OF

GASHOLDERS,

Single-Lift or Telescopic,

With or Without Steel Tanks.

Oil Storage Tanks, Water Tanks, Etc.

ESTIMATES CHEERFULLY FURNISHED.

CORRESPONDENCE SOLICITED.

The order for this Triple-Lift Holder and Steel Tank was received by the Logan Iron Works from the Union Gas Light Company, of East New York. The contract was completed and the Holder was in actual use in 90 days from receipt of order. Capacity of Holder, 500,000 cu. ft.

LOGAN IRON WORKS,

Brooklyn, N. Y.,

MANUFACTURERS OF

Single or Multiple-Lift

GASHOLDERS,

Complete, with Steel Tanks.

BENCHES, SCRUBBERS,
CONDENSERS,
PURIFIERS, IRON ROOFS,

AND ALL PARTS OF

GAS WORKS APPARATUS

Contractors for
Complete Works.

FREDERIC EGNER,

Gas Engineer,

NORFOLK, VA.,

May be consulted with reference to estimates of cost for new, or appraising actual value of existing works; utility of proposed or patented processes; relative earning power to capitalization, and management.

FIELD'S ANALYSIS FOR THE YEAR 1906.

An Analysis of the Principal Gas Undertakings in England, Scotland and Ireland; being the 38th year of publication. Compiled and arranged by JOHN W. FIELD, Sec'y and Gen. Mgr. of The Gas Light and Coke Company, London. Price, $5. For Sale by A. M. CALLENDER & CO., 42 Pine St., New York City.

SELF-INSTRUCTION

For Students in Gas Manufacture.

ELEMENTARY, ADVANCED AND CONSTRUCTIONAL.

Three Volumes. Price, $1.50 each. For Sale by

A. M. Callender & Co.,

42 Pine Street, New York City.

Established 1854.

D. McDONALD & CO.,

MANUFACTURERS OF

WET AND DRY METERS, STATION METERS AND METER PROVERS.

ALSO MAKERS OF

THE GLOVER PREPAYMENT METER.

The amount of gas delivered for the coin can be instantly and positively changed without removing the meter or replacing any parts.

The gas registered agrees absolutely with the amount purchased by the coin.

WE HAVE MADE AND SOLD IN THE UNITED STATES

OVER 120,000 OF THESE METERS,

ALL OF WHICH ARE GIVING PERFECT SATISFACTION.

Correspondence Solicited.

561 West Forty-seventh Street, NEW YORK. | 51, 53 & 55 Lancaster Street, ALBANY, N. Y. | Jefferson and Monroe Streets, CHICAGO.

BEFORE YOU DECIDE

To place your contract for meters send for catalogue and prices of

WESTINGHOUSE DRY GAS METERS

Ordinary Capacity
Large Capacity
Prepayment

A careful examination and thorough test in actual service will demonstrate their superiority.

PITTSBURG METER CO.

East Pittsburg, Pa.

70 PER CENT.

Of Our Output is

PREPAYMENT GAS METERS.

We have fitted up over 16,000 Idle, Regular Meters with our

PREPAYMENT ATTACHMENT.

Can be attached to any make of meter.

NATHANIEL TUFTS METER COMPANY, 455 COMMERCIAL ST., BOSTON, MASS.

MARYLAND METER CO.,

BALTIMORE, North and Saratoga Streets. **CHICAGO, 1307 Railway Exchange.**

CONSUMERS' AND STATION METERS, PRESSURE GAUGES, ETC.

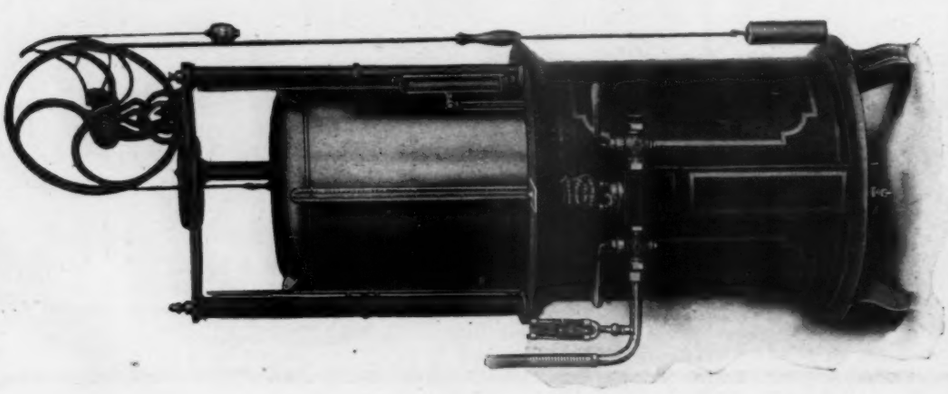
SPECIAL ATTENTION GIVEN TO ALL REPAIR WORK.

"Have you Seen our Complaint Meter?"

WHEN YOU SEND REPAIRS TO US

They can be changed to Prepayment, Prepayment and Beal Straight-reading, or Beal Straight-reading only. Good job. Good time. Good people. Write us.

KEYSTONE METER CO., Royersford, Pa.



METER PROVERS

of

GREATER DURABILITY AND ACCURACY

Are Made by

NEW YORK IMPROVED METER CO.,

Nos. 306-310 East 47th Street,

NEW YORK CITY.

AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Wet and Dry Gas Meters, Station Meters, Meter Provers,
Photometrical Apparatus, Gauges,

PREPAYMENT METERS,

REGULAR METERS REFITTED WITH PREPAYMENT ATTACHMENTS.

HELME & McILHENNY,

Established 1848. **1339 to 1349 Cherry Street, Philadelphia, Pa.**

MANUFACTURERS OF

Wet and Dry Gas Meters, Station Meters, Provers, Gauges, Etc.

METERS REPAIRED

PREPAYMENT GAS METERS.

Our Own Patents. Strong. Simple. PROMPT ATTENTION. CORRESPONDENCE SOLICITED.

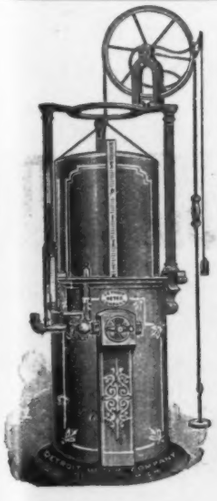
METRIC METAL COMPANY,

MAKERS OF

GAS METERS for NATURAL and ARTIFICIAL GAS.

Special Attention given to Repairing METERS of all Makes.

FACTORY AT ERIE, PA.



DETROIT METER COMPANY,

DETROIT, MICH.

GAS METERS. ✻ METER PROVERS. ✻ METER REPAIRING.

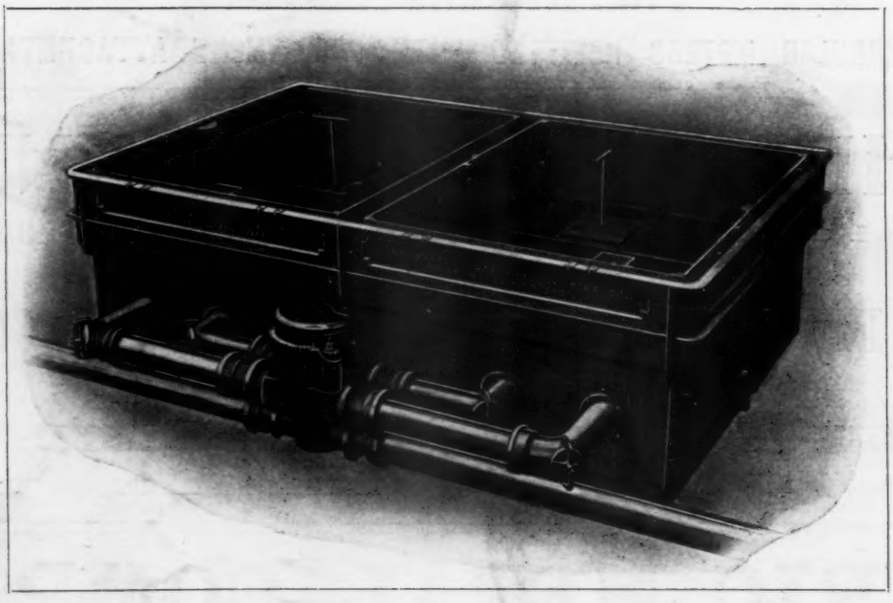
The Quality and Weight of our Materials and Excellence of Workmanship enable us to claim for Detroit Meters GREATER DURABILITY, more ACCURATE REGISTRATION and probability of FEWER REPAIRS.

Prompt Shipments guaranteed by Rail or Lake, saving time and freight expense to Western buyers.

We make a specialty of TINNING AND GALVANIZING Cast and Wrought Iron Work for Gas Companies.

Nos. 306-310 East 47th Street, NEW YORK CITY.

THE WESTERN TWIN PURIFIER.



THE NEATEST, MOST COMPACT AND MOST EFFICIENT PURIFIER BUILT. OPERATED BY MEANS OF OUR DUPLEX VALVE, PERMITTING IMMEDIATE CHANGE OF ORDER OF BOXES. MADE OF CAST IRON OR STEEL, WITH DRY or WET SEAL COVERS.

The Western Gas Construction Company,

FORT WAYNE, IND.

EVERYTHING FOR A GAS PLANT.